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SALVING THE HUTCHINSON.

Probably the most Remarkable Rescue of a Vessel in the History of the Great Lakes—Cool, Daring and Original Work—The Trip down the Lakes in the Dead of Winter.

(Staff Correspondence.)

Buffalo, N. Y., Dec. 24.—The conclusion of what is undoubtedly the most extraordinary trip ever made by a steamer on the great lakes was celebrated by a chorus of shrill whistles and hoarse blasts in this harbor on Sunday morning. Every vessel that had steam up added to the general din, and the air was, indeed, freighted with a clamor that awakened the whole town. Those were happy, howling minutes in which the Hutchinson forged her way slowly up the river to a grain elevator. Notwithstanding the fact that the day was a beastly one, a raw, penetrating, sleet rain falling and freezing as it fell, the docks were lined with thousands, and when the steamer came to her moorings they clambered over the rail in swarms. The pump in No. 7 hatch was pouring out a mixture of water and flax seed, and that was the only visible evidence of anything unusual about the steamer. Beyond that

there was nothing about her to indicate that a trip requiring great fortitude, courage and knowledge had been successfully finished. There was no ice visible on her deck or sides, nothing at all spectacular, nothing but the brown deck and the black hull and the pump in No. 7 working. Liberal applications of hot water, first in the Detroit river and afterward while she lay outside of the Buffalo breakwater waiting for daylight, had removed the ice that covered her during the long trip down Lake Superior, the Sault river and Lake Huron.

It is probably true that no trip of a lake vessel has excited as much interest and comment as this one just completed by the John T. Hutchinson. Every town along the great lakes was deeply interested in her, Cleveland and Buffalo especially so, and she was a common topic of conversation even among people who have no interest in lake shipping. Had she foundered in Lake Erie no one would have been at all surprised. On the contrary, every one would have said they expected it—so completely are the people at the mercy of the newspapers. A moment's reflection ought to convince anyone that the underwriters, their wreckers and the captain of the ship knew precisely what they were about and that they were really depending upon their judgment and not upon chance. They knew their ship thoroughly, they knew its structural strength, and while it is true that they did not know, and for that matter do not yet know, the extent of the injuries to her bottom, they knew precisely the measure of their effect upon her buoyancy.

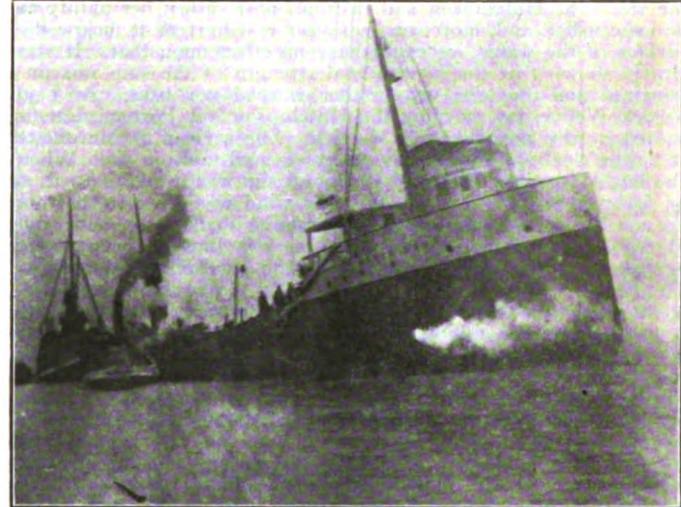
The story of the trip from the time the Hutchinson left Duluth on Sunday afternoon, Nov. 29, until she fetched up at Buffalo Sunday morning, Dec. 20, is one of absorbing interest. A north northeast wind, accompanied by flurries of snow, was blowing fresh all of Sunday afternoon and night after the vessel left Duluth. She was logging about 12 miles an hour when at 10:30 o'clock at night she was brought up standing on a rock about 5 miles west of Eagle River reef. It was at first thought that she had hit the reef, but it was later found that the rock was an uncharted one. Curiously enough the survey showed that had the Hutchinson passed 50 ft. on either side of the rock she would have escaped it altogether. As it was she ran straight upon it, stoving in her whole bottom with the exception of No. 3



Capt. John H. Smith, Master of the Hutchinson.

tank on the port side. Even the forepeak, which is forward of her collision bulkhead, was stove in. Soundings taken immediately showed 16 ft. of water amidships, with 36 ft. at bow and stern. She had a list of 4 ft. to starboard. Torches were thrown into the air and signals of distress sounded, but no one answered them. The crew worked all night lightering the vessel in an endeavor to correct the list. Meanwhile two boats were lowered to leeward as a precaution. In the morning Capt. Smith, accompanied by the second mate and one man, rowed to Eagle River and telegraphed for the life-saving crew. The life-savers arrived about 3 o'clock Monday afternoon and remained aboard all day. In the meantime arrangements were, of course, being made by representatives of the insurance companies, to whom the vessel had been abandoned, for a wrecking expedition. On Tuesday morning it was blowing quite fresh, and Capt. McCormick of the life-saving crew concluded that it would be better to leave the vessel. Accordingly, about 2:30 o'clock, the steamer's crew embarked in the life boats and rowed to the shore. Before they reached the shore the waves were rolling heavily, and as there is no harbor they had to land through the surf. As it was then 2° below zero it was extremely unpleasant wading. This was followed by an experience almost as bitter, however, as they had to take sleighs for a seven-mile drive across to Wolverine in order to get the street cars for Houghton, where they were to meet the wrecking tugs Favorite and Merrick, en route from Cheboygan and the Sault. The crew boarded the Favorite at Houghton and reached the Hutchinson on Wednesday morning.

Work of salvaging the ship was then begun under the direction of Capt. Davis, wrecking master, who represented the underwriters, and Capt. Sinclair of the Great Lakes Towing Co. The question whether the owners would rather have the steamer or the \$210,000 insurance which would be due them in event of total loss need not be answered. It was prudent on their part, in view of the



The Hutchinson on the Pinnacle Rock, off Eagle River, Lake Superior.

information which they had regarding her condition, to abandon her. As she stood upon the rocks she represented a hazard of \$400,000, being \$210,000 for the vessel and about \$190,000 for the cargo of flax seed. Considering her position upon the rocks, the fact that she stood in great peril from gales, that the channels were fast being blocked with ice and that the lights were being removed by the government, it was the part of wisdom to abandon her. The underwriters, therefore, were confronted by a problem about as grim as any which has ever confronted them on the great lakes. They stood in imminent danger of meeting the heaviest single loss in all their lake experience, and an especially grievous one to bear considering their general misfortunes throughout the year. It was almost dollars to doughnuts in marine circles that the Hutchinson would be a total loss. Therefore, the wreckers set to work with their minds very much alert and with a view to adopting extreme measures if necessary. A pump was started forward with a view to raising the vessel at the head, but it was found that flax seed will not pump. In this it differs from corn, barley and the common run of grains. It clogged at the base of the pump. Pumps were then placed in the second after hatch and in No. 1 hatch, and while one pump was busy pumping flax seed out another was busy pumping water in. The mixture flowed freely. Meanwhile the crew bagged some of the flax and put it aboard the tug Rogers. The anchors were also thrown overboard to assist in easing the vessel. The weather

favored them and so well did they progress with their work that on Friday morning Capt. Sinclair telegraphed the towing company that with twelve hours more of steady work they would have the steamer free. However, he was not destined to have the additional twelve hours for work. At 3 o'clock that afternoon it began blowing so hard that the Favorite could not stay alongside. In fact the crew had to leave in such a hurry, scrambling aboard the Favorite, that they had no time to bank the fires. As it was the Favorite had difficulty in finding the canal, so heavy was the snow storm accompanying the wind.

The position of the steamer on the rocks was northeast by east, and that was its position when the crew left so precipitately on Friday afternoon. It was 2 o'clock Saturday afternoon before the Favorite was enabled to return to the wreck. What was the surprise of the crew to note that the position of the steamer had changed. Her position was now directly northwest, or precisely at right angles to what it had been. Investigation showed that the storm had lifted her from the pinnacle of rock and that she was riding easily at anchor. After lifting her from the rock the storm had driven her with such violence to the full length of her anchor chains as to cause her to lose one of her anchors; but the other held. The crew climbed aboard, but found no steam up. While the crew were building the fires the Favorite towed the Hutchinson by the stern so as to be well out of the neighborhood of the rock, breaking a fluke from the remaining anchor while doing so. The anchor would have been hoisted, of course, had there been steam up to do so. As soon as steam was up the Hutchinson beat the tugs into Portage canal, saluting them hoarsely. She also towed in Capt. McCormick and three of his crew in the life boat. As it was blowing fresh and as the steamer was moving fast the life boat was continually drenched with spray. Capt. McCormick says that it was the chilliest and wettest journey he ever underwent.

The Hutchinson got to Portage canal at dusk Saturday and men were immediately employed to move the grain to the port side to correct the list to starboard. This, with an examination of the hull by the diver, occupied the time until the following Tuesday. Capt. Smith says that the cargo was trimmed in such a manner as to withstand three gales of wind. Capt. Davis, Capt. Sinclair and Capt. Smith also made a very thorough study of the effect of her injuries upon her powers of flotation. In determining this they considered her condition while she was riding at anchor and her condition after she had made the trip to Portage canal. They demonstrated that the pumps could easily control her, and if she had made the lesser trip why couldn't she make the greater one down the lakes. There was absolutely nothing to be feared from the ice. The Hutchinson had in times past shown her ability as an ice crusher, and, moreover, with her real hurt 18 ft. below the surface of the water, ice could have no effect upon that. It was clearly shown that the longitudinal strength of the ship was unimpaired and that she was neither warped nor bent. At 1:30 o'clock Wednesday morning the Hutchinson left Portage accompanied by the Favorite and Merrick. She arrived at Marquette at 1:40 o'clock on Wednesday afternoon and took on fuel. When she left Marquette Thursday afternoon she was drawing 19 ft. 6 in. forward and 20 ft. 1 in. aft. The wind was quite fresh from the northwest and soon a sea was running that the Favorite and Merrick, which were to accompany the Hutchinson, were unable to make headway against and they had to put back to Marquette. The Hutchinson proceeded alone, reaching the Sault Friday afternoon. She laid there all night. In the morning, after shipping a new anchor and taking off the after steam pump, which was not deemed necessary, as the vessel was then making no water aft, the Canadian lock was passed with a draught of 19 ft. 4 in. forward and 19 ft. 7 in. aft. Probably no vessel of a deeper draught has ever attempted to navigate the St. Mary's river. She was accompanied down from the Sault by the tug Thompson. The trip across Lake Huron was cold and stormy, but the steamer made about 10 miles an hour, reaching Lambton about 3 o'clock Sunday afternoon and anchoring for the night, owing to the fact that the lights were out on the rivers. The navigation of the rivers was extremely slow work on account of the ice. In Lake St. Clair it was especially thick, there being 5 in. in the clear, and the tug General was engaged to proceed ahead of the Hutchinson and break it.

It was when the Hutchinson reached Sandwich on Monday afternoon that the newspapers got up another scare. In order to cross the Lime-Kilns it was necessary to further lighter the steamer, and the lighter Newman worked all night in removing a part of the cargo. The easing up of the pressure on the tank tops caused a leak under No. 7 hatch, but instead of nearly causing the vessel to founder, as was generally announced, it had the merit of exposing the real seat of the vessel's weakness; for she remained dry both fore and aft. A pump was installed in No. 7 hatch and the leak was comfortably cared for. Under escort of the car ferries Promise and Pleasure she left Sandwich at 10:50 o'clock Thursday morning. One of the ferries went ahead and broke the ice and when she became stalled the other, being usually in the rear, would pass to the side of the Hutchinson, and both ferries would then buck it together. A halt was made at the Lime-Kilns for car ferries Pere Marquette No. 20 and Pere Marquette No. 16, which were on their way to Lake Michigan from Cleveland. As soon as they had passed, the Pleasure and Promise and Hutchinson dropped into their tracks. A stop was made at Bar point at 5 o'clock for the night. All day Friday, from 7:30 a.m. to 5 p.m., was spent in negotiating the 30 miles between Bar point and the middle ground light, the ice being from 10 to 12 in. thick. Saturday morning at 8:30 o'clock clear water

was reached abreast of the southeast shoal and the Promise and Pleasure returned to Detroit. Both these ferries were each paid \$500 per day for their services, the high figure being justified by the fact that no insurance could be obtained upon them.

The wind was fresh from the south all day, but the trip across Lake Erie was uneventful. The Hutchinson reached Buffalo at 3 o'clock Sunday morning and lay outside until 7 o'clock, when the tug Hebard towed her to the Washington elevator attended by the metallic chorus as outlined in the beginning of this article.

Results count. The Hutchinson was on the rocks in Lake Superior and she is now safely in Buffalo with a goodly part of her cargo intact, for flax seed sheds water like a duck's back. Nearly a thousand miles of unlighted channels had been successfully run and a ship that seemed almost certain to go to pieces is destined for many more years of life. In the history of the lakes no piece of salvage work compares with this, either in skill, in daring, in judgment displayed or in the sum saved. To Smith, Davis & Co., who represented the insurance companies, praise is especially due for the competent manner in which they handled the whole situation. They took the initiative from the beginning and they prosecuted it with great vigor and courage. Nor did they make a single misstep. Everything they did was sensible and prudent. Nothing was left to chance; everything was calculated carefully in advance, and actions, which appeared on their surface to be reckless, were really the result of sound investigation and accurate knowledge of conditions. Neither Capt. Davis, nor Capt. Sinclair, nor Capt. Smith had the least doubt whatever but that the steamer could be safely taken to Buffalo. The fact that they were right is proved by the indisputable fact that the steamer is in Buffalo.

There were amusing sidelights. For instance, various of the worthy denizens of the upper Michigan peninsula had apportioned the vessel among themselves in their mind's eye. They, none of them, believed that she would be got off, but that she would be broken on the rocks. One of them was going to take the dynamo and start in the electric lighting business; another had use for her engines; a third could place her boilers to advantage; still another was to exchange his hard fisherman's bed for the soft leather covered lounge of the captain's cabin; and altogether the vessel was mentally dismembered. But the bolder among them were not satisfied with the mere intellectual contemplation of the pillage. Heaven only knows how they did it, but on the first night that the crew was absent they succeeded in reaching her, boarding her and making away with all the silverware and considerable of the bedding. Later a part of the plunder was returned and mysteriously dropped on the deck; still later more of it was sent back as though the evil doers repented of their misdoings, or, what is more likely, feared the strong arm of the law.

It is to be said to the credit of the crew that they had entire confidence in their leaders. True, some of the firemen were a little frightened and there was a little friction between deck and engine-room forces. But the inducement of bonus quieted the dissatisfied ones. There was some dispute when the steamer got to Sandwich as to the amount of the bonus. Capt. Davis thought he had promised the firemen \$25 each, but they insisted that the amount was \$50. The question was submitted to the American consul at Sandwich and it was compromised for \$37.50. This circumstance created a little ill-feeling at the time, as both sides were morally certain that they were right.

INDORSES THE SUBMARINE.

Lieut. John Halligan of the United States navy has been making a practical study of submarine boats and submarine warfare with the result that his views have now been placed before the navy department. He declares the submarine, when within torpedo range, the superior of the battleship, since the battleship is vulnerable to the torpedo, the weapon of the submarine. The principal quality of the submarine—that of submergence and invisibility—gives the best protection against attack. He says:

"The present state of development of the submarine, with its automobile torpedo, is such that when the boat is submerged and within torpedo range, it must be admitted that the disablement or destruction of the battleship is probable—the degree of probability and the amount of damage depending principally upon the number of torpedoes that can be discharged by the submarine, and on her facilities for locating and estimating the range of the target. Thus the submarine, within the limitations given above, is eminently successful. In the present phase of submarine boat development, considering the varying conditions of distance, state of sea and weather, as well as the probable speed and course of a watchful enemy, the power of placing the submarine well within the torpedo range constitutes by far the most important factor of the problem. Inasmuch as the different types may be supposed to be armed with the same efficient and trustworthy type of torpedo, and as the daring and skill of the personnel may be equal for all types, it is seen that the true measure of the efficiency of any submarine boat is the ability successfully to place itself within torpedo range of the enemy. When the earnest call for the submarine comes, the final measure of the worth of existing types will rest upon their ability to attain a position of advantage against the enemy."

He believes the logical development of the type will be a submersible cruiser of greater size and cruising radius with a surface speed sufficient to enable her to run down her prey and to cruise with a battle squadron.

PURCHASE OF CHILIAN IRONCLADS.

Description of Vessels Recently Purchased by British Admiralty—New Anchor Liner—Glasgow Letter.

Glasgow, Dec. 14.—The sensational deal of the British admiralty, briefly mentioned in last letter, in the purchase of the two Chilian battleships, which it was believed that Russia wanted and that Japan had secured, merits some further attention. The matter will interest your readers. These two vessels were launched in January of this year, the Constitucion by Armstrong, Whitworth & Co., Newcastle-on-Tyne, and the Libertad by Vickers' Sons & Maxim, Barrow-in-Furness. They were contracted for in February, 1902, to be completed within eighteen months, but in consequence of the arrangement of peace terms between Chili and Argentina, construction was not carried out at the contracted speed. The vessels are each 436 ft. in length and 71 ft. in breadth, with a displacement of 11,800 tons and a draught of only 24 ft. 7 $\frac{1}{2}$ in. They have twin engines of 12,500 I. H. P., capable of obtaining a sea speed of 19 knots, and they carry enough coal to enable them to steam at 10 knots for 12,000 sea miles. They were constructed under the direction of Sir Edward Reed and Admiral Simpson, and carry all the most modern scientific apparatus for signalling and other purposes, as supplied to the latest vessels of European navies. These two battleships are, for their displacement, the most powerfully armed vessels afloat. Each carries four 10-in. guns, mounted in pairs in barbettes fore and aft; fourteen 7.5-in. quick-firing guns, ten of which are mounted in the citadel, and four in casemates on the upper deck; fourteen 14-pounder quick-firing guns; four pom-poms; four Maxims; and two 12 pounder field guns. There are two submerged torpedo tubes. Each ship can fire a total weight of 13 $\frac{1}{2}$ tons of projectiles in a minute, with a collective energy of 1,700,000 foot-tons as compared with 9 tons of 1,000,000 foot-tons of the Russell class of battleships already in the British navy. Of protective armor they carry a 7-in. belt amidships from barbette to barbette, and from 5 ft. below the water line to the upper deck, but only 3 in. thick fore and aft of the barbettes. When Chili and Argentina made terms of peace last year one of the conditions was that the Constitucion and Libertad, building for Chili, and the Rivadavia and Moreno (armored cruisers of 7,700 tons displacement), then building at the yard of Gio. Ansaldo & Co., Gestrì Poente, Italy, for Argentina, should be sold. The work of completing the four vessels was then proceeded with at a slower rate. As British property the Libertad will be renamed Swiftsure and the Constitucion will be called Triumph.

The Libertad meantime has just completed all her trials on the Clyde, and to these I now refer. The trials of this ship have been of exceptional interest because of the great power incorporated in the design, and demonstrated by the tests in the full-power trial. This trial resulted in a speed of 20.17 knots being maintained for six hours, this speed being the admiralty mean of six runs over the measured mile. The first test consisted of a series of progressive speed trials over the measured mile. Twelve knots was attained with the engines making ninety revolutions and developing less than a sixth of the total power. The next stage increased the speed by three knots, or 25 per cent., but it demanded a doubling of the power; 2 $\frac{1}{2}$ knots more necessitated an addition of about 80 per cent., while the run at full power gave over 20 knots, but required a further addition to power of 80 per cent. Some adjustments were made in auxiliary details of the machinery before proceeding on the long-distance trial which, was to be of any duration the naval commission might desire, not exceeding 48 hours, and to be at a speed to be determined by the naval commission. This commission, I may state, had as its chief Admiral Simpson of the Chilian navy, who suggested during construction many important details which add to the fighting efficiency of the Libertad.

The trials were attended by Mr. T. E. Vickers, C. B., chairman of the builders' company. The speed at which the long-distance run was made was 17 $\frac{1}{4}$ knots, and in a calm sea the Libertad steamed right down the Irish sea into St. George's channel. During this run of 27 hours everything went splendidly, and the twelve water-tube boilers worked without any trouble whatever. Under natural draft the coal consumption for all purposes worked out at 1.71 lbs. per indicated horse power per hour. Notwithstanding the duration of this trial the Vickers' directors decided to have a short run at full power. For a couple of hours the speed over the measured mile was maintained at about 19 $\frac{1}{2}$ knots. On another day the ship started on her full power trial in weather unpropitious for a true test of speed, the wind coming in rough bursts with sleet and snow. But notwithstanding this the trial was a great success. While the guaranteed speed was 19 knots, the builders had much in reserve, with the result that the admiralty mean of six runs over the course was 20.17 knots with a power very little in excess of the 13,000 originally specified. The machinery ran with marked uniformity of revolutions, the variations between the maximum and the minimum being barely 2 per cent.

Later came the test of the guns. The first guns fired were four new pom-poms on the military tops, then the Maxims, four of which have also been fitted, and then four 6-pounders fitted on pedestal mountings. On the upper deck are fourteen quick-firers, firing 14-lb. projectiles, this auxiliary armament constituting the most powerful battery for the repelling of attack by torpedoes and submarine boats. The pom-poms fire 300 shots per minute, the six-pounders about twenty to twenty-five and the 14-pounders fire fourteen rounds per minute. The new Vickers' 7 $\frac{1}{2}$ -in. guns were brought into play, which guns take the place of the 6-in. guns on the British battleships. The heavier gun is exactly double the

lighter gun in power and falls very little short of it in its rapidity of fire. The 7 $\frac{1}{2}$ -in. guns fire a 200-lb. shot with nitro-cellulose powder for which they have been adapted. The muzzle velocity is 3,000 ft. per second, which means a very long range. The 7 $\frac{1}{2}$ -in. guns were tested for rapidity of fire, and eight rounds per minute was attained. Several of these guns were simultaneously fired to ascertain the effect on the structure of the ship, as were also the 10-in. guns, two of which are fitted in the forward barbette and two in the after barbette. Examination showed that not even the light electric fittings had been damaged in any degree by the concussion. The 10-in. guns, which fire a projectile of 500 lbs. weight with nitro-cellulose, attained a muzzle speed of 2,850 ft. per second, a muzzle energy very little short of that of the 12-in. guns. The Libertad has thus not only very high speed, but a very powerful armament and she has hardened armor on the complete broadside. In combination with these fighting qualities she has a large radius of action with a coal capacity sufficient to take her at cruising speed to New York and back.

ANOTHER NEW ANCHOR LINER FOR MEDITERRANEAN-NEW YORK TRADE.

Another new Anchor liner for the Mediterranean and New York service, the Italia, has just been launched by D. & W. Henderson & Co., Glasgow. Her dimensions are: Length 400 ft.; breadth 49 ft.; depth 30 ft. 9 in., moulded, with a gross tonnage of 5,000 and a deadweight capacity of 7,000 tons. She has been built to the highest class of the British Corporation, and will be supplied with a set of triple-expansion engines of the very latest type, the cylinders being 30, 50 $\frac{1}{2}$, and 85 in. diameter, with stroke of 4 ft. 6 in. There are two double-ended and two single-ended boilers, all working at a pressure of 200 lbs. Passenger accommodation has been made a special feature. On the promenade deck there are placed large, airy, and well-lit staterooms, with two berths in each, for first-class passengers; and a handsomely-appointed saloon with piano, library, etc.; also smoking room and well-fitted bath rooms and lavatories, and a sheltered promenade on the upper and lower bridge decks, which can be used in all weathers. The bridge deck house and main decks have been fitted with steerage berths of a very superior character, for about 1,400 passengers, but so subdivided that there will be privacy for the women and children and married people, and no overcrowding. The Italia, like all the other vessels of the Anchor Line Mediterranean fleet, has been fitted throughout with electric light, both on deck and below deck, in every passage and compartment. Wide shelter decks have been erected over the weather deck, both forward and aft, providing ample promenade accommodation for the large number of steerage passengers to be carried, while these decks also afford a convenient and airy protection from rain or spray. Special attention has been paid to the culinary arrangements, which have been designed so that the food which is provided for the Italian passengers can be cooked in their own manner. There is a carefully-planned insulated chamber below deck, kept constantly cool by a large refrigerating machine placed in the engine-room. A fully-equipped surgery and two hospitals are on the bridge deck, quite apart from the passenger accommodation, with separate baths, lavatories and everything necessary to a first-class hospital. There are also isolation hospitals on the poop deck for infectious cases. The plans of the Italia have been submitted to the Italian emigration commissioners and received their approval. Care has been taken to comply with all the requirements of both the Italian and American passenger acts. The Italia is to be ready to sail from Naples on her first trip about the middle of February and will perform the voyage from Naples to New York regularly in twelve days at all seasons of the year. It is thirty-five years since the Anchor Line began this service from the Mediterranean to New York, so they have thus been much longer engaged in it than any of the Italian, French, German or British lines with which they have now to compete.

VESSEL FOR THE CARRYING OF EXPLOSIVES.

An interesting vessel of a somewhat novel type, for the carrying of explosives, has been launched from the yard of Napier & Miller here, namely, the steel screw coasting steamer Lady Tenant, built to the order of Nobel's Explosives Co. The principal dimensions of the vessel are: Length between perpendiculars, 165 ft., breadth, 26 ft.; depth, moulded, 12 ft. 6 in., with a gross tonnage of about 500 tons. The vessel has been built on the raised quarterdeck principle, with short bridge and topgallant forecastle, under Lloyd's special survey for class 100 A1 for the coasting trade, the bottom of the vessel having extra strengthening to permit of her taking the ground in tidal ports. Water ballast has been provided for in cellular double bottom under holds, also in fore and after peaks. Ample accommodation is provided for captain, officers and engineers in the bridge and in a house aft, while the crew are berthed forward under the main deck. The holds are especially arranged for explosives. The vessel has large hatches and two steam winches and derricks for handling cargo, also steam windlass, steam steering gear and steam warping winch. The machinery, which is placed aft, is supplied by David Rowan & Co., Glasgow, and consists of triple-expansion engines with cylinders of 16, 26 and 43 in. diameter and 30 in. stroke, having one large boiler and also a donkey boiler. The hull and machinery have been constructed under the joint direction of George M. Currie of Nobel's Explosives Co. and John Reid & Co., naval architects, Glasgow.

It is natural, of course, to associate the new Allan Line turbines with the acceleration of the Canadian mails. One of the two turbine steamers contracted for by the Allan Line for their Canadian trade, the Victorian, will be launched in the spring, and be placed on the service in August, but the second will not likely be

eady until the St. Lawrence season opens in 1905. These with the Bavaria and Tunisian will provide weekly mail service for Canada equal to any on the Atlantic. The mails by the Allan Line will leave Moville at 1:30 p. m. on Fridays arrive at Rimonski at 1:30 p. m. on the following Thursdays, and be delivered in Montreal the following morning. The average time made by the mail boats this year between Moville and Rimonski has been under seven days, and with the turbine 17-knot steamers it will be considerably shortened.

Workman, Clark & Co., Belfast, the builders of the first Allan turbine, have just received an order for three steamers of 4,000 to 5,000 tons each for the Boston Fruit & Produce Co. They are intended for the fruit trade between the United States and the West Indies.

SCHWAB'S ANSWER IN SHIP BUILDING SUIT.

Mr. Charles M. Schwab has filed his answer in the case of the United States Ship Building Co. He specifically denies everything charged against him under the title of fraud, conspiracy, unlawful combination or wrongful act. Then he outlines his connection with the Bethlehem Steel Co. and the ship building company. He says that after making contract for the purchase of the entire capital stock of the Bethlehem company he communicated with J. P. Morgan & Co., stating that he was willing to turn over the contract to the United States Steel Corporation without any profit whatever. Morgan & Co. assumed the contract as syndicate managers, with authority to turn it over to the Steel Corporation. If, however, the Morgan firm disposed of it to other parties Mr. Schwab was to receive the greater part of the profit. On June 13, 1902, Messrs. Nixon and Dresser told Mr. Schwab they wished to acquire the Bethlehem Steel Co. in order to transfer it to the ship building company, making payment therefor in bonds and stock of the new company. They offered \$10,000,000 each of bonds, preferred and common general stock. Mr. Schwab then opened negotiations with J. P. Morgan & Co., offering to provide the cash necessary to reimburse them the actual cost of the shares of the Bethlehem company to the syndicate and \$5,000,000 in stock. This offer was accepted and Messrs. Nixon and Dresser were so informed. Then followed Mr. Schwab's illness and his absence from the United States until March 17, 1903. Upon his return he found the ship building company in financial difficulties and learned for the first time that many of the representations in the prospectus of the ship building plants were false. He also found that more capital was needed for the ship building company, as well as for the Bethlehem company, the money for the latter to go for betterments.

Last April George R. Sheldon and Charles W. Wetmore of New York, representing a syndicate which had purchased \$13,750,000 of the bonds and stock of the ship building company, conferred with Mr. Schwab looking to a reorganization of the company. Mr. Schwab said he desired to take back the Bethlehem stock, returning to the ship building company the bonds and stock he had received. Subsequently for that purpose he purchased from J. P. Morgan & Co. \$5,000,000 of stock which had been delivered to them for the United States Steel syndicate and arranged to acquire all the remaining bonds and stock. Mr. Schwab adds: "I was then and have since been and am now able and willing to return all the securities received by me or by Messrs. Morgan & Co., or to rescind the whole transaction, and I hereby tender the same for that purpose."

"As to the charges in the cross bill," said Mr. Schwab, "that I acted in collusion with the reorganization committee of the ship building company in an attempt to force the insolvency of said company and to wreck it, I aver that such charges are not only false and malicious, but were made without justification and in disregard of facts well known to the cross complainants. I aver that James Smith, jr., receiver of the ship building company, knows that such charges are untrue. I am informed and believed that upon such examination it will appear that the net working capital of the seven constituent companies, excluding the Bethlehem, does not exceed the sum of \$1,500,000; that a great part, if not the greater part thereof, will be wasted and lost by the continuance of the receivership and that such ship building plants cannot be operated and kept working as going concerns without the addition of very large sums of money as necessary working capital."

REFUSED APPLICATION FOR SECOND RECEIVER.

Judge Kirkpatrick in the United States district court at Newark last week refused to grant the application by the Mercantile Trust Co. of New York, trustee of the \$16,000,000 bond issue by the United States Ship Building Co., for the appointment of a receiver of the company's property in New Jersey covered by the mortgage securing the bonds. This and other property of the company has been in possession of Receiver Smith. It consists of the plants of Samuel L. Moore & Sons and the Crescent Ship Yard. The ground set forth in the application for a receiver was the failure of the company to pay the \$400,000 of interest and \$200,000 of sinking fund falling due on July 1 last. In deciding against the application for a receiver Judge Kirkpatrick said a receiver had already been appointed. A second receiver would certainly come in conflict with the present one, as there was a doubt as to just what property the mortgage covered, and questions would continually arise. There should be no reason for the removal of a receiver who was trying to do his best under responsible counsel.

UNION OF SAILING SHIP OWNERS.

To be Formed as Result of Paris Conference—Signs of more Ship Building on the Mersey than in the Past—Turbine Steamer for the Lakes.

Liverpool, Dec. 14.—The international conference of sailing ship owners has just concluded its deliberations, which have extended over two days, and among ship owners here there is general satisfaction expressed that the delegates representing the important sailing ship-owning interests in Great Britain, Germany, France, Italy and Norway have recognized the necessity of concerted action as a means of raising the freights of the long-distance voyage sailing ships from the low level to which they have fallen as a result of over competition and the French bounty system. One important result is that an international union of sailing ship owners is to be formed, whose object shall be to ameliorate the present deplorable conditions under which their trade is carried. In arriving at this decision the conference endorsed the absolute necessity of fixing minimum rates of freight for the various voyages in which sailing ships are principally engaged. The international accord is likely to be also extended to other matters such as the modifications to be introduced in existing contracts, a revision of the conditions of charter parties, a means of preventing the desertions so frequent from sailing ships and other disabilities at present existent.

Ship building returns in the various centers relating to the year now drawing to a close are being compiled, and those relating to Barrow are just announced. The total output amounts to 42,912 tons and 46,900 I. H. P., against 18,382 tons and 9,340 I. H. P. last year and 26,800 tons and 51,000 I. H. P. in 1901. These figures include two very powerful battleships, namely, the Dominion for the British navy (16,350 tons and 18,000 I. H. P.) and the Chilean Libertad of 11,800 gross tons and 12,500 I. H. P., which has just been purchased by the British admiralty, both built by the great Barrow establishment of Messrs. Vickers' Sons & Maxim, while this firm has also built a large cargo boat of 8,704 gross tons, and the two speedy channel steamers, Colleen Bawn and Melifont, each having engines of 4,000 I. H. P., besides other smaller craft.

Ship building on the Mersey has been a decaying industry for some years past, owing to disturbances on account of the building of new docks displacing several yards, but this year's figures, which I have just gleaned, are well over last year's returns. Messrs. Laird Bros. (practically the only yard undertaking big work at present) have launched seven vessels of 5,638 gross tons and 38,900 I. H. P., four of which are torpedo boat destroyers for the British navy each 620 tons and 7,000 I. H. P., with a speed of 25½ knots. This firm has also built and engined the Topaze, which is of 2,860 tons, 9,800 I. H. P., and 21¾ knots. It is hoped that the Mersey will once more take its place among the leading ship building centers. The Mersey dock board is just now walling in Traumere bay for the Traumere Bay Development Co., who propose building on the land thus reclaimed, amounting to about 71 acres, two dry docks, 700 and 800 ft. long respectively, and also a large wet dock capable of accommodating the largest vessels using the port. They will also erect fourteen building slips capable of producing vessels 900 ft. long. It should be stated that Messrs. Laird Bros., whose yard adjoins the bay which is being acquired by the new company, are largely interested in the new enterprise.

Messrs. Workman & Clark, ship builders of Belfast, have within the past few days secured an order for the construction of three steamships of between 4,000 and 5,000 tons gross each for the American firm which trades under the name of the Boston Fruit & Produce Co. These vessels are intended chiefly for the conveyance of fruit from the West Indies. The building of these vessels will, it is expected, give a fillip to the Belfast shipping trade, the depressed condition of which I referred to in my last letter.

The report is current here that Messrs. R. & W. Hawthorn. Leslie & Co. of Hebburn-on-Tyne, have just secured an important order for a high-speed passenger steamer to be propelled with turbine engines. The vessel is intended for service on the great lakes and will carry between 1,500 and 2,000 passengers, and will be the first turbine steamer to trade in American or Canadian waters. This firm were the first British builders to be identified with turbine vessels, and as the Parsons type of turbine is to be adopted, after careful examination of the new French and American types, the vessel will be both built and engined on the Tyne-side.

After much effort the new chief constructor of the navy, Rear Admiral Washington L. Capps, has obtained an increase of his corps. There were four vacancies in the personnel of the naval construction branch and for some time an effort has been made to have assigned to the corps young line officers who would take a post-graduate course at the Massachusetts Institute of Technology before entering upon the active discharge of duties. Efforts made by Rear Admiral Bowles failed, owing to the opposition of the bureau of navigation, but when Mr. Bowles resigned, taking with him one of the constructors, there seemed additional reason why these assignments should be made. Rear Admiral Capps, therewith, presented the question as one of great importance, in view of the increased demands upon the officers of the corps. He asked for four officers, and three have been designated. They are Ensign James L. Ackerson, who is attached to the Illinois; Midshipman Donald R. Battles of the Montgomery, and R. D. Gatewood of the New York.

LEGISLATIVE PROGRAM FOR AID TO SHIPPING.

It can be definitely announced that no effort will be made at this session of congress to secure the passage of a bill providing compensation in aid of any department of the American merchant marine. This has been arrived at by the leaders after a survey of the field, and in view of the hostility of a certain element in the house of representatives, including Speaker Cannon, and probably a majority of the committee on merchant marine and fisheries. It is known that no measure could, at this time, pass the house, and its passage, therefore, through the senate, even if possible, would be useless. All interests really in favor of adequate aid to shipping have, therefore, reached the president's opinion—that a commission to inquire into it is the most practical thing that can be accomplished at this time. It will have the merit, at any rate, of focusing attention upon the merchant marine and of presenting in a convincing manner the evidences of needed help. To this end Representative Gardner has introduced a bill, as outlined in the last issue of the Review, to appoint a commission to inquire into the state of American shipping. This commission is to consist, as suggested by the president, of the secretary of the navy, the postmaster general, the secretary of commerce and labor, three members of the senate and three members of the house. Any bill framed upon the recommendation of this commission will, of course, have the authority of the administration behind it; and if the report of the commission is ready by Dec. 1 next it is expected that a shipping bill can pass both houses at the short session before March 3.

Meanwhile as a part of the legislative program in aid of the American merchant marine Senator Frye has introduced two bills which, it is expected, will be passed at the present session. One of these measures provides that "vessels of the United States, and no others, shall be employed in the transportation by sea of coal, provisions, fodder or supplies of any description, purchased pursuant to law, for the use of the army or navy; but this section shall not be construed to prohibit the transportation of such articles by any vessel owned by any department of the government." It is further provided that the president of the United States may from time to time suspend the provisions of this act, if, in his judgment, the national defense requires it. The second bill extends the coastwise laws of the United States to the trade "between ports of the United States and ports or places in the Philippine archipelago." It is provided that this extension of the coastwise laws shall not be construed to prohibit the sailing of any foreign vessel between the United States and Philippine ports, provided that no merchandise, other than that imported in such vessels from some foreign port which has been specified on the manifest as from another port and which shall not have been unladen, shall be carried. A further provision of this bill stipulates that until congress shall have authorized the registry as vessels of the United States of vessels owned in the Philippine archipelago, the government of the Philippine islands is authorized to adopt from time to time and enforce regulations governing the inter-island transportation of merchandise and passengers. It is the general understanding that the coastwise laws shall not be extended to this inter-island traffic before July 1, 1906.

It has been asserted that there is not sufficient tonnage available under the American flag to care for the commerce between the United States and the Philippines, but evidence obtained upon inquiry does not support the assertion. The whole present volume of our import trade from the Philippines does not exceed 80,000 tons, including the goods that come to the Pacific coast. There are plenty of American ships to carry this as the following table of available steam tonnage will show:

	Dead weight capacity, tons.	Net register tons.
Maine	12,000	5,077
Missouri	12,000	5,077
Massachusetts	12,000	5,131
Mississippi	12,000	5,131
Minnetonka	7,000	3,860
Minnewaska	7,000	3,862
Northwestern	3,300	1,299
Northeastern	3,300	1,496
Northman	3,300	1,306
Northtown	3,300	1,297
J. L. Luckenbach	6,000	3,192
Lewis Luckenbach	5,500	2,574
Harry Luckenbach	4,500	1,799
Julia Luckenbach	4,500	1,977
Lansing	7,000	3,600
Roma	4,000	2,164
Washtenaw	4,250	2,003
Argyll	4,250	1,880
Mackinaw	4,000	2,005
Leelanaw	3,500	1,377
Edith	3,500	1,495
Dorothy	3,500	1,629
Evelyn	2,800	1,185
Mae	2,900	1,281
Pathfinder	4,500	1,800
Indiana	4,000	2,561
Pennsylvania	4,000	2,567
Conemaugh	3,000	1,739
Hugoma	3,200	1,284
Lessell	2,800	1,225
Mineola	4,000	1,891
	160,900	74,761

It is true that some of these vessels are employed in the tank oil trade but they are capable of rapid conversion, and as an offset to them the following list of vessels, belonging to the American-Hawaiian Steamship Co., at present engaged in trade between United States ports and Hawaii, might be employed in the Philippine trade:

	Dead weight capacity, tons.	Net register tons.
Texan	12,000	5,636
Alaskan	12,000	5,621
Arizonan	12,000	5,621
American	8,500	3,643
Hawaiian	8,500	3,651
Oregonian	8,500	3,651
Californian	8,500	3,716
Nebraskan	5,000	2,824
Nevadan	5,000	2,824
	80,000	37,187

MONTHLY SUMMARY OF NAVAL CONSTRUCTION.

The monthly summary of construction, issued by the naval bureau of construction and repair, shows the usual degree of progress in the building of naval vessels. The Louisiana, building at the Newport News yard, has increased her lead by 1 per cent. over the Connecticut, building at the New York navy yard. The score stands 24 per cent. for the Connecticut and 31 per cent. for the Louisiana. Following is the summary:

Name.	Building at	Degree of completion.	
		Nov.	Dec.
Battleships.			
Missouri	Newport News Co.	99	99
Ohio	Union Iron Works	82	83
Virginia	Newport News Co.	47	50
Nebraska	Moran Brothers Co.	30	30
Georgia	Bath Iron Works	37	40
New Jersey	Fore River Ship & Engine Co.	46	48
Rhode Island	Fore River Ship & Engine Co.	47	48
Connecticut	Navy yard, New York, N. Y.	21	24
Louisiana	Newport News Co.	28	31
Vermont	Fore River Ship & Engine Co.	0	1
Kansas	New York Ship Building Co.	5	2
Minnesota	Newport News Co.	4	8
Armored Cruisers.			
Pennsylvania	William Cramp & Sons	60	63
West Virginia	Newport News Co.	64	67
California	Union Iron Works	43	48
Colorado	William Cramp & Sons	65	67
Maryland	Newport News Co.	60	63
South Dakota	Union Iron Works	41	44
Tennessee	William Cramp & Sons	10	12
Washington	New York Ship Building Co.	8	9
Protected Cruisers.			
Denver	Neafie & Levy	98	98
Des Moines	Fore River Ship & Engine Co.	94	96
Chattanooga	Lewis Nixon	74	72
Galveston	William R. Trigg Co.	68	69
Tacoma	Union Iron Works	93	96
St. Louis	Neafie & Levy	32	34
Milwaukee	Union Iron Works	35	38
Charleston	Newport News Co.	53	55
Gun Boats.			
Dubuque	Gas Engine & Power Co.	10	15
Paducah	Gas Engine & Power Co.	9	13
Training Ships.			
Cumberland	Navy yard, Boston	0	7
Intrepid	Navy yard, Mare Island	0	6
Training Brig.			
Boxer	Navy yard, Portsmouth, N. H.	2	3
Torpedo Boats.			
Stringham	Harlan & Hollingsworth	95	93
Goldsborough	Wolff & Zwicker	99	99
Blakely	George Lawley & Son	99	99
Nicholson	Lewis Nixon	99	99
O'Brien	Lewis Nixon	98	98
Tingey	Columbian Iron Works	97	100
Steel Tugs.			
Pentucket	Navy yard, Boston	90	96
Sotoyomo	Navy yard, Mare Island	90	95

The newspapers handle the merger of the American Sheet Steel Co. and the American Tin Plate Co. as though they were entirely independent concerns, not appearing to understand that they have a common ownership. The new subsidiary company of the United States Steel Corporation will be known as the American Sheet & Tin Plate Co. of New Jersey and will have headquarters at Pittsburg. Both the sheet steel company and the tin plate company have been manufacturing somewhat similar products and the purpose of the merger is to economize in production. The officers of the new company are: Chairman of executive committee, George L. McMurtry; president, W. G. Graham; first vice-president, W. M. Leeds; second vice-president, Eugene W. Pargny; secretary and treasurer, H. B. Wheeler.



ORE DECREASE LARGELY IN NOVEMBER.

The best evidence of the fact that the iron ore interests of the Lake Superior region had planned early in the season of navigation for the reduction in output of ore that was forced upon them by the conditions of the iron and steel market is shown in a summary of ore shipments after Nov. 1 compared with the full season's shipments. It will be noted from the tables appended herewith that of the total season's decrease of 3,889,509 tons (gross tons in all cases) more than one-half occurred after Nov. 1. The decrease after Nov. 1 was 1,752,823 tons. The amount of ore shipped after Nov. 1, 1902, was more than double that shipped after Nov. 1, 1903. The tables are also interesting as showing the percentage of decrease from the different ports.

IRON ORE SHIPMENTS FROM LAKE SUPERIOR REGION.

Ports.	Shipped after Nov. 1, 1902	Percentage of total after Nov. 1, 1902	Shipped after Nov. 1, 1903	Percentage of total after Nov. 1, 1903
Escanaba	691,336	22.90	364,496	28.78
Gladstone.....	10,724	.36	4,461	.35
Marquette.....	229,172	7.59	121,467	9.60
Ashland.....	348,156	11.53	164,503	12.99
Superior.....	473,676	15.69	263,639	20.98
Duluth.....	689,823	22.19	173,310	13.69
Two Harbors	596,136	19.74	172,324	13.61
	3,019,023	100.00	1,266,200	100.00

Decrease, 1903, in shipments Nov. 1 to close of season, 1,752,823 tons, or 58.06 per cent. compared with same period in 1902.

Ports.	Shipments full season of 1902	Percentage of total season of 1902	Shipments full season of 1903	Percentage of total season of 1903
Escanaba.....	5,413,704	20.02	4,277,561	18.09
Gladstone.....	92,251	.34	85,816	.36
Marquette.....	2,595,010	9.59	2,007,346	8.49
Ashland.....	3,553,933	13.15	2,823,119	11.94
Superior.....	4,180,568	15.46	3,978,579	16.82
Duluth.....	5,598,408	20.71	5,356,473	22.65
Two Harbors	5,605,185	20.73	5,120,656	21.65
	27,039,059	100.00	23,649,550	100.00

Decrease in 1903, 3,889,509 tons, or 12.54 per cent.

SEEKING TO REMOVE CHICAGO RIVER TUNNELS.

During the past week Mr. Harvey D. Goulder, counsel for the Lake Carriers' association, and Mr. William Livingstone, president of the association, went to Washington and appeared before the interstate committee on behalf of the bill introduced by Representative Mann of Chicago to remove from the Chicago river the obstructions now caused by the Washington, La Salle and Van Buren street tunnels. The bill declares these tunnels to be an obstruction to the navigation of the Chicago river and makes it the duty of the secretary of war, in conjunction with the chief of engineers, to cause notice to be served on the parties owning and controlling the tunnels to remove them within a reasonable time. The bill provides that at the expiration of the time agreed upon by the secretary of war and the chief of engineers the continuance of the obstructions will be regarded as a misdemeanor subject to a fine of \$10,000 a month. As it is generally conceded that these tunnels are an obstruction to navigation, the committee gave the greater part of the hearing to those that were opposed to the bill, in order that they might have the fullest opportunity for argument. A delegation from the common council of Chicago was present. They granted that the tunnels were an obstruction and were harmful to navigation, which was suffering in consequence, but claimed that there was a controversy as to the use of the tunnels by the traction companies, which are now exclusively using them, as to whether the traction companies could be compelled to lower the tunnels or whether the expense would fall upon the city. There was also involved a franchise right, the city having given in 1886 permission to the traction companies to use the tunnels for twenty years. Incidentally it was brought out that the traction companies are seeking permission to use the overhead trolley system in the down town district of Chicago, which is being bitterly fought by business men. If the tunnels are abolished and bridges thrown across the river the traction companies maintain that the cable system would be useless and that they would have to cross by overhead wires. The delegation from the council represented that these, and various other collateral points, would be determined in three years' time by suits

now pending in the courts. They, therefore, suggested an amendment to have the notice served three years hence instead of "within a reasonable time." This was vigorously opposed by other Chicago interests, led by Representative Mann, who showed great interest in the subject.

Mr. Goulder took the position for the Lake Carriers' association that the committee ought not to enter into the intricacies of Chicago municipal politics and traction controversies. He held that the case was safe for all parties concerned by putting it into the hands of the secretary of war and chief of engineers to enforce the removal of the obstructions within a reasonable time. He claimed that the question was broader than the vessel interests alone. It affected not only the right of navigation but that of the producer and consumer as well, who had the right to insist that the waterway which bore their products should not be unreasonably obstructed. One of the sanitary district commissioners being called upon, admitted the seriousness of the obstructions but claimed that the sanitary board was without jurisdiction in the premises so long as they were enabled to get the flow of water required by state law through the river with the tunnels as they are. This brought up the question of delays and damages to vessel property by reason of the excessive current in the river, but the vessel interests, while not waiving it by any means, did not discuss that phase of the subject. The chair announced that the opinion was unanimous that the tunnels were an obstruction to navigation and that they could not be too quickly removed for the advantage of all concerned. The sole question, he held, was whether the conditions justified the amendment of three years time or whether the secretary of war might be empowered to cause them to be removed within a reasonable time. The committee took the subject under advisement. Control of the Chicago river was, by a river and harbor act of some years ago, vested in the federal government, which is the reason that the subject is now before congress instead of, as is customary with purely local streams, before the common council of Chicago.

LARGE LIGHTHOUSE TENDER FOR LAKE SUPERIOR.

Secretary Cortelyou has submitted to congress an estimate for a new lighthouse tender for the eleventh district to cost \$130,000. In the annual estimates of the lighthouse board for the fiscal year ending June 30, 1905, two appropriations are asked—one of \$13,000 for a small steam tender for use in attending the lights and buoys in Superior and St. Louis bays, entrance to Duluth harbor, and another of \$15,000 for a small steam tender for use in attending the lights and buoys in Portage lake and river. It is now believed that one large steam tender would do the service proposed for these two small tenders and in addition it would do much other service which is greatly needed. The inspector of the eleventh lighthouse district, with headquarters at Detroit, sent the following letter to the board:

"The board's attention is respectfully invited to the needs of the district, which are increasing all the time. More lighthouses and more fog signals have been established of late years, and more are to be. There is a constant cry for, and need of, more gas buoys, and yet no more gas buoys can be taken care of with present facilities. As more fog signals and lights have been established, the supplies (coal and others) have also increased. There are but four stations which are accessible enough to cities, so except these four nothing is supplied by contract, as in some other districts. It is with the greatest difficulty that the tender Marigold can now provide and do her other necessary work, and if she is not kept constantly on the go, without any delay nor diverted for any other special duty, something has to go by the board. Before long there must be another tender, of Marigold size, for Lake Superior alone, and one that can get to work early in the season, and which should winter in that lake. Then gas buoys could be placed in Lake Superior if we are able to get means of obtaining gas there, but now, even if they could be cared for, they are of little use, as the Marigold could not place them till her first trip in June, and they must be taken up on her last trip in October. I lay before the board the following data of work for this season, which speaks for itself:

"Supplies delivered by the Marigold for the season, namely, 659 tons egg coal in bags to twenty-eight fog-signal stations, 111 tons chestnut coal in bags for watch room purposes, to forty-five light stations; 28 cords hard wood to nine fog-signal stations; 4 cords hard wood to two light vessels; 4,577 cans mineral oil, in addition to paints, oils, and other supplies, to 250 lighthouses, light vessels and post lights. There are thirty-five gas buoys and four gas beacons, thirty-nine in all, which are pumped three times a year—81,885 cu. ft. of gas pumped into buoys and beacons. The tender sets in the spring and takes up in the fall two float lights, forty-four spar buoys, eleven iron buoys, and thirty-two gas buoys. She also brings to depot 200 30-ft. cedar logs for buoys, takes

100 finished buoys and sixty stone sinkers to various contractors, besides many other stores, boats, etc. Mileage each month: March, 293 miles; April, 1,664; May, 1,318; June, 2,215; July, 2,416; August, 2,111; September, 1,318; October, 2,144; November, 1,252; December, 295; total for season, 15,026 miles. There are to date 247 lighthouses and post lights, thirty-five gas buoys, and four gas beacons in this district. If comparison is made it will be seen that there are about 120 more lighted aids in this district than in the ninth and tenth districts added."

Secretary Cortelyou thereupon recommended the construction of the large tender suitable for the purpose instead of two small ones.

GENERAL CUT IN WAGES AT MINES.

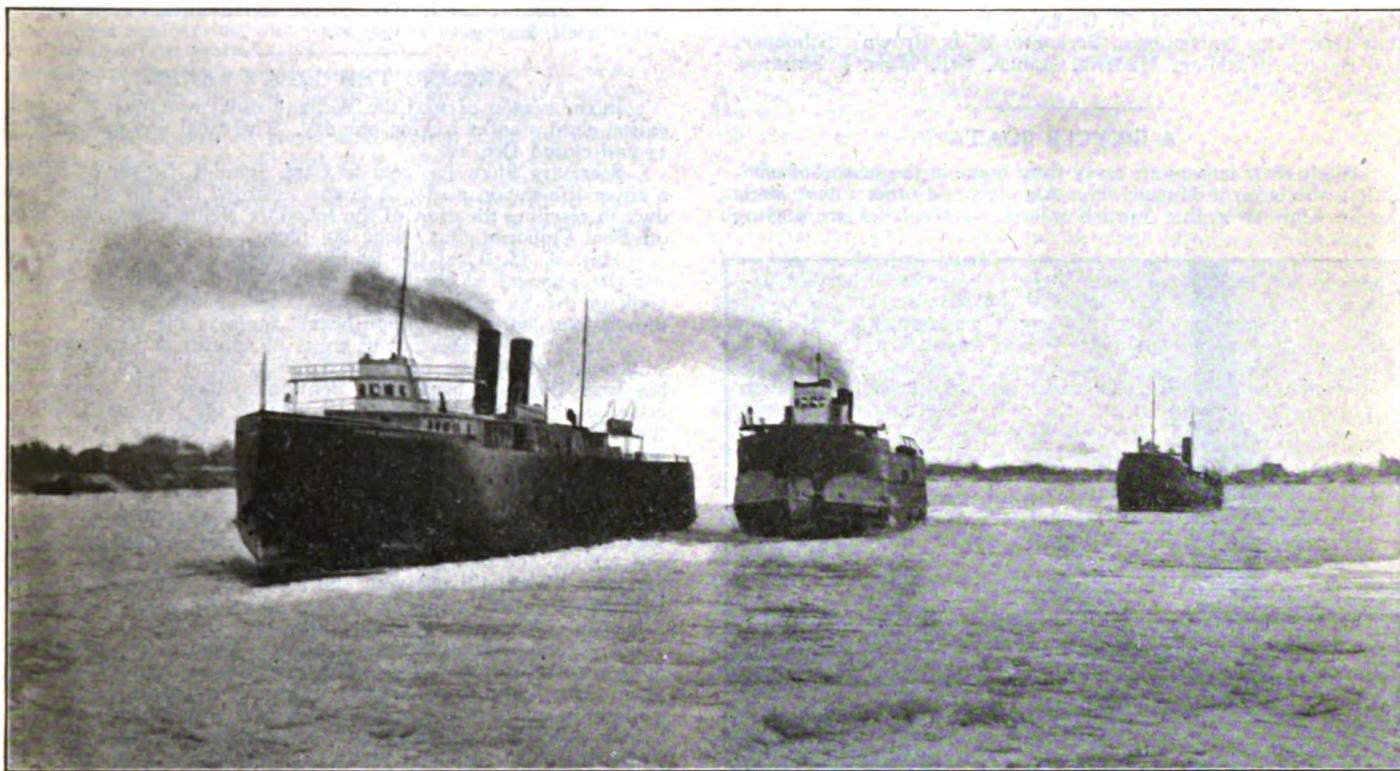
Duluth, Minn., Dec. 23.—The iron mining companies will on Jan. 1 reduce wages about 10 per cent. for miners, less for laborers and more for higher salaried men in all departments. The cut will mean that contract miners will receive about \$2.10 a day, which is better than they had during the dull times of 1893-4 but less than they have been receiving since then. Salaries will have a sharp and severe cut, and some men will be let out altogether. Some salaries are to be cut, it is said, as much as 40 per cent., but

ators who had considerable stripping to be done, other firms entered the business, until now there are some six new concerns at work on the Mesabi alone, all with remunerative contracts.

It is now expected that Shenango mine, belonging to the Clairton interests, will begin hoisting ore in February. Development at this mine was begun two years ago and they have been busy ever since. The Shenango is in section 22 58-20 and is a very valuable mine. It is, however, very wet, and this combined with quicksand has been too much for early completion of development work.

LAKE SHIP YARD MATTERS.

Although it is expected that the West Bay City yard of the American Ship Building Co. will be closed during the winter, the new ships, together with a very large volume of repair work, will keep big forces employed at the other yards. The lake ship yard outlook is on the whole far more satisfactory than it was a short time ago. The Lorain, Cleveland and Detroit yards seem to have been selected for most of the new work. The Buffalo yard has repair jobs scheduled for almost the entire winter. At the South Chicago yard the steamer W. L. Brown is now in dock for repair of damages sustained by her in stranding on the Lime-Kiln cross-



Car Ferries Pere Marquette No. 20 and Pere Marquette No. 16; and Steamer Tampa in Windrowed Ice at the Lime-Kiln Crossing, Dec. 17.

this is probably very exceptional only in cases where it makes little difference whether or not the employee remains at all. The wisdom of cutting 40 per cent. and letting the employee so reduced stay in employment at all is questionable. Miners and most others will make little complaint on account of the reduction. It is expected that when prices of material reach their former level wages will return to approximately what they have been. The reductions are to be general throughout the Lake Superior region.

Two hundred and fifty men who had just gone to work stripping at the Leonard mine, near Hibbing, were thrown out by reason of a demand of four steam shovel cranesmen for 30 cents a day better wages. The shovels were both closed for the winter. These cranesmen were getting \$4.50 a day. The force worked four and a half days and will now look for something else till next April.

Contracts will soon be let for the construction of a line of road from the main line of the Duluth, Mesabi & Northern road to the Monroe, Chisholm, Clark and Shenango mines. The line will be about five miles long, including spurs, and will have one high trestle 1,750 ft. long. Much of the road will be double track. It will be needed for ore traffic in the spring.

The Drake & Stratton Co. stopped all its stripping shovels last Saturday, and will not resume until about March 1 next. The company has been stripping this year at the Stevenson, Fayal, Leonard, Morris and other mines, employing some eleven shovels, thirty to forty locomotives of various sizes, and more than 1,000 men. They have moved about 2,500,000 cu. yds. of material this year, including earth, hardpan, rock and boulders. This firm has in sight for next year about 1,800,000 yds. of work, of which that at Fayal is the chief item. Stripping conditions on the Mesabi range have changed very materially in two years. Up to two years ago there were but two important firms engaged in the business, the Drake & Stratton Co. and Winston & Dear. The former had all work but that at Mahoning, which was regularly under charge of the other concern. Encouraged by independent oper-

ing. About thirty-five plates are being removed, some of them to be renewed; some others will stand rerolling and replacing and something like forty are to be faired in place. This steamer will be in the dock about three weeks. She will be followed by the Arthur Orr for extensive repairs to bottom and also some engine repairs. The Scranton will follow the Orr for miscellaneous engine repairs and bottom work. The Nottingham will follow the Scranton

BIG CUT OF PULPWOOD.

Duluth, Minn., Dec. 23.—The cut of pulpwood in the forests about the head of Lake Superior on the American side will be twenty-five times as large as it was last winter and three times greater than in any preceding year. It will amount to not less than 120,000 cords. This means more than 600 men all winter in the woods, 10,000 carloads to terminals, and an enormous business. Much of this pulpwood goes all rail to mills in Wisconsin and Illinois but much goes by lake to Lake Erie ports. On the Canadian side of the lake the winter's cut of pulpwood will be about 25,000 cords, all of which will go out by lake.

MR. COULBY ACCEPTS NEW OFFICE.

Mr. Harry Coulby has decided to accept the management of the vessel interests of the United States Steel Corporation on the great lakes. He will occupy the dual offices of president and general manager of the Pittsburg Steamship Co., succeeding Mr. D. M. Clemson as president and Mr. A. B. Wolvin as general manager on Jan. 1. That his mind may be single for his new task he will resign as president and treasurer of the Great Lakes Towing Co. and sever all active connection with Pickands, Mather & Co., though he will probably retain his financial interest in that firm. The headquarters of the Pittsburg Steamship Co. will be in Cleveland instead of in Duluth, where they were under Mr. Wolvin.

CHICAGO WINTER FLEET.

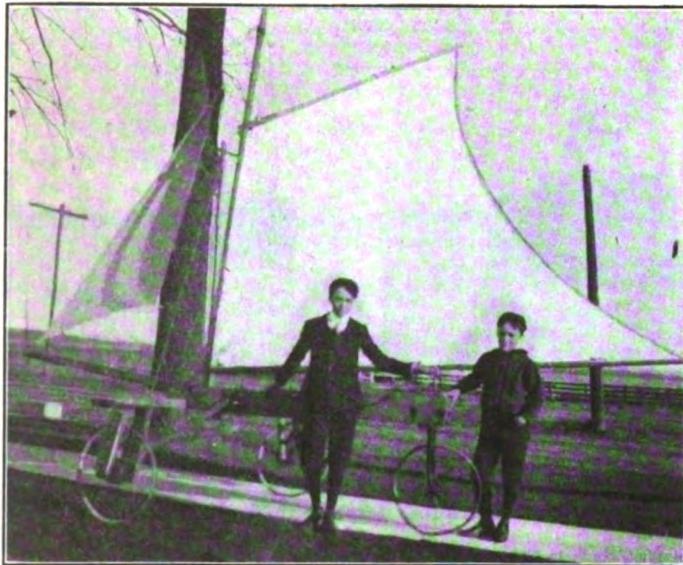
The Review last week contained a summary of the grain capacity of vessels laid up in Chicago and ports tributary thereto. The winter fleet at Chicago and South Chicago is as follows:

Chicago: Steamers—Cuba, P. D. Armour, T. W. Palmer, W. M. Egan, Madagascar, Auburn, R. P. Fitzgerald, J. Spaulding, Schuylkill, Susquehanna, D. C. Whitney, McVittie, H. R. James, Major, Chemung, Neosha, Panther, Black Rock, Cranage, City of Paris, Conemaugh, Nyanza, Ravenscraig, Arabia, Buffalo, Tuscarora, Parks Foster, Owego, Seneca, Peerless, I. H. Owen, City of Traverse, Osceola, P. P. Pratt, Jay Gould, Syracuse, L. L. Barth, Oscoda. Schooners and barges—Harold, Connelly Bros., Delta, D. L. Filer, Iad Corning, Halsted, A. M. Peterson, Middlesex, Nirvana, R. L. Fryer, Galatea, Oak Leaf, Jas. Mowatt, Berwyn, W. Wing, Apprentice Boy, Belle Brown, B. Barnes, B. Calkins, Cora A., M. Dall, Ford River, G. M. Filer, R. Howlett, Ida, Iver Lawson, R. Mott, C. Marshall, Geo. A. Marsh, J. H. Mead, J. E. Merrill, L. Nau, H. A. Richmond, Resumption, H. Taber, Geo. L. Wrenn, Westside, York State, Alice, Butcher Boy, R. Campbell, Ada Madora, F. C. Leighton, Lotus, Lake Forest.

South Chicago: Steamers—Saxon, Wawatam, C. R. Van Hise, Mataafa, Cornell, Black, W. H. Gilbert, Sir H. Bessemer, Jas. Watt, Frick, S. F. B. Morse, Maricopa, Thompson, J. W. Gate, C. Hoyt, J. B. Colby, Mariska, Corona, O. M. Poe, Wilson, Kanawaha, Kennebec, M. T. Green, J. R. Langdon, Illinois, Arthur Orr, Wm. Nottingham, Scranton, U. L. Brown. Schooners and Barges—Roebling, Madera, Manila, Bell, Maia, J. Smeaton, Elgin, Goodman.

A BICYCLE BOAT.

While their fathers are away from home in the season of navigation, the boys of Marine City, Algonac, and other towns along the St. Clair river that furnish sailors for the lakes are playing



Bicycle Boating at Algonac.

along lines of their dream of the future—to command a big ship. The boys in the picture herewith are sons of Capt. Chas. Galton of the steamer Moses Taylor. With their ice boat placed on bicycle wheels they are said to have made 8 miles an hour under a good breeze along the cement sidewalks of Algonac.

HUTCHINSON SHOAL.

In answer to inquiry from the Marine Review, Major W. L. Fisk of Detroit, who is in charge of the United States lake survey office, makes the following statement regarding the rock on which the steamer Hutchinson stranded:

"The rock upon which the Hutchinson struck is about 5 miles to the westward of Eagle River light station and only about 3,000 ft. from shore. It is therefore too close inshore and too far from the ordinary track of vessels to be a serious danger, especially as it lies on a shore well known to be dangerous and in a position no vessel would knowingly approach. An effort was made recently to make a survey of the locality but the weather rendered it impossible."

SUBSCRIBERS TO THE SPEYER SYNDICATE.

Speyer & Co., who bought in the Consolidated Lake Superior Co., last week, to protect their loan of \$5,050,000, have issued a circular to the members of the syndicate which subscribed to the loan. The circular provides that the banking house, by virtue of the purchase, should, with the consent of the syndicate members, take full title to the security of the loan and exercise all the rights of owners in regard to the properties, incumbering, selling or otherwise disposing of any of them, or in reorganization on lines to be determined by them, with respect to any of the constituent companies. In the event of such reorganization the circular provides that the bankers may determine the character,

priority and class and amount of any stocks or securities to be issued. They may admit to the benefits on such terms as they see fit any of the creditors of the Consolidated company or of its subsidiary companies. A list of subscribers to the Speyer syndicate was made public as follows: Fidelity Trust Co., Philadelphia, \$500,000; First National Bank, Philadelphia, \$300,000; Merchants' National Bank, Philadelphia, \$240,000; Fourth St. National Bank, Philadelphia, \$200,000; Bank of North America, Philadelphia, \$200,000; Commercial Trust Co., Philadelphia, \$300,000; Real Estate Trust Co., Philadelphia, \$100,000; Franklin National Bank, Philadelphia, \$100,000; Girard National Bank, Philadelphia, \$100,000; Western National Bank, New York, \$100,000; Morton Trust Co., New York, \$100,000; Guaranty Trust Co., New York, \$100,000; Bank of Montreal, Montreal, \$100,000; Imperial Bank, Toronto, \$200,000; Kuhn, Loeb & Co., New York, \$250,000; E. J. Berwind, New York, \$100,000; Henry K. McHarg, New York, \$100,000; John J. Terry, New York, \$150,000; Orvis Bros., New York, \$50,000; Charles E. Orvis, New York, \$25,000; Samuel H. Cramp, Philadelphia, \$5,000; F. H. Dyckman, Philadelphia, \$10,000; Aaron Fries, Philadelphia, \$10,000; John W. Moffly, Philadelphia, \$25,000; Silas W. Pettit, Philadelphia, \$25,000; Samuel Rea, Philadelphia, \$15,000; Lynde Harrison, New Haven, \$10,000; Holmesdale National Bank, \$25,000; Industrial Trust Co., Providence, \$50,000.

The amounts, irrespective of the contribution of the banking house itself, aggregate \$3,490,000.

AROUND THE GREAT LAKES.

In the season of 1903 the Welland canal was opened to navigation eight months lacking one day. The canal was opened April 13 and closed Dec. 12.

Secretary Shaw has sent to Capt. John R. Glover of Buffalo a silver life-saving medal of honor, awarded him for gallant conduct in rescuing the crew of the schooner Nellie Mason, two miles off Port Colborne, Ont., Sept. 29, 1895.

Maj. W. H. Bixby has let the contract to Capt. H. W. Baker for the removal of the stern section of the steamer Glidden, sunk in the St. Clair Flats canal. Capt. Baker will have it removed long before navigation begins again in the spring.

The United States circuit court of appeals at Cincinnati has confirmed the decision of Judge Swan in adjudicating the Columbia Iron Works a bankrupt. Petition to have this concern declared bankrupt was filed Sept. 16, 1903, by the National Lead Co., the Central Electric Co., and the Gregory Electric Co., of Chicago.

Among a group of vessel men in the Perry-Payne building, Cleveland, a few days ago, speculating on Mr. A. B. Wolvin's successor as manager of the Steel Corporation fleet of vessels, was Capt. John Mitchell, who has a few fairly-good ships himself. Some one jokingly asked him why he did not apply for the big job. "Well, I'll tell you," he answered. "It's just this way with Mitch. He'd rather be quite a fellow for a long while than a h-l of a fellow for a little while."

A Calumet dispatch says that some important work will be done in the waters adjacent to Keweenaw point during the coming year. The Eagle River light is not now located as favorably as it might be and an effort will be made to have it moved or to build a new lighthouse at Sand Hills. Another important piece of work will be the removal of the pierhead and fog station at the Portage lake upper canal to the end of the breakwater, the light in the present location being misleading.

Regarding the proposed ship-canal around the rapids at the head of the Niagara river, which is of so much importance to the Tonawandas, Col. Thomas W. Symons, while he was in charge of the Buffalo district, submitted to the war department a report recommending the canal and giving the commercial reasons therefor. This recommendation was approved in so far that the surveys, plans and estimates were ordered to be prepared. Since then the plans have been completed by Major Symons' successor, Col. Theodore A. Bingham, and all the papers are now in the hands of the war department. They have not yet been printed but probably will be at an early date.

The big car ferry built at the Wyandotte yard of the Detroit Ship Building Co. for St. Clair river service of the Pere Marquette railroad was launched on Saturday last. In construction the new ferry differs from anything now on the lakes, having four propeller wheels, two at each end, driven by compound engines with cylinders 28 and 52 in. in diameter by 36 in. stroke. Four Scotch boilers, 13.6 ft. by 13.6 ft. will furnish steam. This car ferry will run between Sarnia and Port Huron and is constructed with especial reference to the ice conditions which obtain there. Anchor and slush ice oftentimes obstruct the channel there but it is expected that the ferry will meet with nothing that it is not able to contend with. The new ferry will be ready for work by Feb. 1.

The steamer Siberia of the Gilchrist fleet reached Milwaukee on Monday with her cargo of coal, having been out sixteen days from Sandusky. She was badly damaged in passing through the ice fields at the head of Lake Erie so that when she got into Lake St. Clair she went to the bottom in shallow water. After she was floated she was taken to Marine City for temporary repairs. When Mackinac was reached she was unable to make any headway against the ice in the Straits. It was thought she might have to winter there but Mr. Gilchrist telegraphed the captain to wait for ice crushers Pere Marquette No. 20 and Pere Marquette No. 16, which were on their way to Lake Michigan, and follow in their wake. The weather, however, moderating, Capt. Ashley decided to push on and succeeded in breaking through.

OF INTEREST TO COAL CONSUMERS.

That trite old saying, "a penny saved is a penny gained," appeals with more than ordinary force to large consumers of coal, as every penny saved in consumption of fuel adds that much more to profits for the factory or steamship owner. Everyone at all posted in the matter is well aware of the fact that the item of consumption of coal on a steamship, or a land plant of any dimensions, is one to be seriously reckoned with. Among the many devices of a fuel-economy kind the Crowe mechanical stoker is worthy of more than a passing notice. This stoker is the invention of Mr. Paul L. Crowe, a practical engineer, formerly a resident of the great lakes region but now located in Jersey City, N. J., where he has formed the International Stoker Co., with offices at 109 Montgomery street. This company owns the patents on the Crowe stoker for foreign countries, while the Duluth Stoker Co. of Duluth, Minn., controls the United States, by virtue of grant from the inventor. As a consequence of its introduction on the great lakes over twenty of the largest steamships of that district have been fitted with this stoker, with most satisfactory results. The vessels on which the stoker has been installed are among the finest of the big freighters for which the lake region is noted, with quadruple-expansion engines and Babcock & Wilcox water-tube boilers, representing the highest practice in marine engineering, and some of the stokers have been in use for the past four years.

Readers of the Review will remember the test of this stoker made on the steamer John W. Gates, now of the Steel Corporation fleet, by Lieut. Comdr. J. H. Perry and Lieut. B. C. Bryan, representing the bureau of steam engineering, navy department. The Gates is 498 ft. over all and 52 ft. beam, with depth of 30 ft. The main propelling engine is of the direct-acting, inverted jet-condensing, quadruple-expansion type, with cylinders of 16 $\frac{1}{2}$, 25, 38 $\frac{1}{2}$ and 60 in. diameter and stroke of 40 in. The two boilers are of the Babcock & Wilcox make, each containing 3,000 sq. ft. of heating surface and having a working steam pressure of 250 lbs. There were two stokers under each boiler. The grate surface under each boiler was 54 sq. ft., so that there was a total of 108 sq. ft. of grate surface and 6,000 sq. ft. of heating surface. The independent auxiliary machinery consisted of a main air pump, a main feed pump, an auxiliary feed and ash pump, two ballast pumps, one deck pump, two dynamo engines, a steering engine, a windlass engine, a capstan engine, five winch engines, a ventilating blower and four stoker engines. The bilge and cooler pumps were worked from the main engine. A summary of the test follows:

Duration of test	10 hours
Average number revolutions per minute of main engine.	82.77
Average steam pressure	244
Average vacuum	24
Average air pressure (natural draft)	0.3 in.
Average indicated horse power.....	1430.7
Pounds of coal per indicated horse power per hour, as fired	1.56
Pounds of coal per indicated horse power per hour, dry..	1.5
Pounds of coal burned per square foot of grate surface, per hour	20.62
Pounds of water evaporated from and at 212° per square foot of heating surface	3.5
Evaporation from and at 212° per pound of coal as fired..	9.43
Evaporation from and at 212° per pound of coal dry.....	9.8

With accelerated draft the stokers were made to burn as high as 34 lbs. of coal per square foot of grate per hour. The auxiliaries in operation during the whole test were, air pump, feed pump and the four stoker engines. One dynamo engine ran three hours, exhausting into a third receiver of the main engine. During the trial a test was made to ascertain the amount of steam used by stoker engines. To this end the exhaust from one of them was disconnected from the others and was led to a barrel containing cold water and was weighed as it condensed. It was then found that this engine used 35 lbs. of water per hour while running at ordinary speed, and therefore the water required for operating four stokers is shown to be about 140 lbs., or 17 $\frac{1}{2}$ gallons, per hour. It will be noted in this test that but 1.5 lbs. of coal is required per indicated horse power, while many of our battleships and cruisers are consuming from 2.5 to 3 lbs., or double the amount, in order to obtain like results.

The value of the stoker on land is attested by the following report of a trial on boiler No. 18 of the Duncan Co.'s plant, Mechanicsville, N. Y., equipped with a Duluth (Crowe) stoker. The test was made Aug. 27-28, 1903, by Wm. Barnes, chief engineer for the Duncan Co., and James Benar, erecting engineer for the Duluth Stoker Co.

Method of starting and stopping.....	Alternate
Duration of trial	24 hours
Fuel used.....	Shawmut, run of mine, bituminous
Type of boiler.....	Horizontal tubular
Diameter of boiler.....	6 ft. 6 in
Length of boiler.....	20 ft
Number of tubes.....	128
Diameter of tubes.....	3 $\frac{1}{2}$ in
Heating surface.....	2,462 sq. ft
Rated horse power.....	200
Dimensions of stoker.....	6 ft. wide, 9 ft. long
Grate surface.....	54 sq. ft.
Ratio of heating surface to grate surface.....	45.5 to 1

Average pressures:

Steam by gauge.....	88.05 lbs
Draft, inches water.....	363
Position of damper.....	Wide open
Average temperatures:	
Feed water.....	146.11° F.
Flue gases.....	499.6° F.

Fuel:

Weight of coal as fired.....	24,683 lbs.
Moisture in coal.....	2.05 per cent
Weight of dry coal fired.....	24,177 lbs.
Total ash and refuse.....	3,445 lbs.
Proportion ash, etc.....	14 per cent
Dry coal burned per square foot grate per hour.....	18.6 lbs.

Evaporation:

Total water fed to boiler.....	214,013 lbs.
Factor of evaporation.....	1.1062
Equivalent evaporation from and at 212°.....	236,741 lbs.
Equivalent evaporation from and at 212° per pound coal as fired	9.59 lbs.
Equivalent evaporation from and at 212° per pound dry coal	9.79 lbs.
Equivalent evaporation from and at 212° per pound combustible	11,407 lbs.
(Evaporation not corrected for quality of steam.)	

Average horse power developed.....	283.4
Horse power of boiler, builder's rating.....	200
Per cent. beyond rating.....	41.7

Besides being a fuel and labor saver this begets a much more perfect combustion than the ordinary furnace, and thus by its use the maximum of smokelessness is obtained, a very desirable feature either on land or water, and in many instances worth more than cost of its installment.

A mammoth freighter, to carry 10,000 tons of ore and costing \$470,000, is to be built by the American Ship Building Co. at Lorain, O., during the coming winter by the Acme Steamship Co. of Duluth, and it is reported that the Duluth (Crowe) stoker will be used under Babcock & Wilcox water tube boilers in this vessel. A duplicate of the boiler and stoker plant is to be shown at the coming St. Louis fair.

NEW SHIP YARD ENTERPRISE.

Mr. Henry W. Cook, who was formerly identified with lake transportation interests, and at present manager of the Cook Cummer Steamship Line (steamers Westover, Roanoke and J. J. Hill), has undertaken the construction of a new fleet to aid in forwarding to the northern markets the large yellow pine output of the Cummer Lumber Co. of Jacksonville.

The designs of this fleet were prepared by Messrs. Matteson & Drake, naval architects of Philadelphia, and include a large steel sea-going tug and six wooden barges of the capacity of 1,200 tons each. The contract for the tug has been placed with the Burlee Dry Dock Co. of Staten Island, and the construction is now well under way. This tug will be one of the most powerful tow boats of its size on the coast, and will be equipped with all the latest devices for economy and convenience, including a Chase towing machine and steel wire hawser. The tug is 137 ft. over all, 27 ft. beam and 16 ft. molded depth, and is equipped with triple-expansion engines of 16, 25 and 42 in. cylinder diameters by 30 in. stroke. Steam is furnished by one Scotch boiler, 14 ft. 6 in. diameter and 12 ft. long, built for 180 lbs. working pressure.

The barges are to be built entirely of the best quality of longleaf southern pine, and will each be of the following dimensions: Length over all 191 ft.; extreme beam 35 ft.; molded depth 19 ft. They are designed to carry their entire load of yellow pine below decks thereby eliminating the danger caused by deck loads in stormy weather.

Mr. Cook has established a modern ship yard close to the Cummer Lumber Co.'s saw mills at Jacksonville, Fla., where the construction of the barges is now in progress. The natural advantages of the location selected are many, the climate being especially suitable, permitting work to be carried on economically during the entire year, as very great extremes in temperature are unknown. The close proximity of the saw mills and standing timber makes it possible to effect a large saving in cost of material, while the labor market is more satisfactory than in the north. A complete outfit of labor-saving tools and appliances have been installed, including a pneumatic plant for boring and bolt driving. This new yard is incorporated under the name of the Southern Ship Building Co. There is ample space in the yard and all the facilities for building any size vessel. Mr. Cook has announced his intention to furnish estimates on any size or style of wooden vessel that may be in the market, and inquiries may be sent either directly to the ship yard at Jacksonville, Fla., or to the office of Matteson & Drake, 706 Bourse, Philadelphia, who have been retained to furnish designs for work in the new yard. As business warrants, a dry dock will probably be added to the plant. Then repairs of all descriptions will be undertaken. With the constantly increasing commerce of Jacksonville, this latter project will undoubtedly be very successful.

A favorable report has been ordered by the senate committee on commerce on the bill appropriating \$575,000 for a lighthouse on Diamond shoals, Cape Hatteras.

SAILING VESSELS PROTEST AGAINST DISCRIMINATION.

Owners of American sailing vessels in the coastwise trade will make a determined effort to get congress to remove discrimination against such vessels under the compulsory pilotage laws of southern states. A bill has already been introduced by Senator Frye and the vessel owners and all allied interests will do their best to secure favorable action. The Maritime Exchange of New York, as well as similar bodies at other north Atlantic ports, will unite in the movement. Prominent vessel interests in the east have been interviewed on the subject. Mr. W. A. Anderson, who is largely interested in the coastwise vessel business, said:

"No language is too strong to denounce the unjust and unwarranted discrimination against American sailing vessels in the coastwise trade which for years has existed under the compulsory pilotage laws of various Southern states. For over thirty years we have suffered from this discrimination against sail and in favor of steam vessels, our direct competitors, for congress abolished the compulsory pilotage state tax on coastwise steam vessels in 1871. The tax is a state imposition upon the interstate commerce of the United States; it is exacted only under the laws of eight states against the interests of the people not only of those states but also of the rest of the country. It is a most unjust tax, because it exacts payments for pilots' services neither needed, nor in many cases rendered, and often impossible for them to perform. The government boards of local inspectors of steam vessels issue licenses to masters, mates and pilots of steam and sail vessels; the men licensed by them have successfully commanded vessels for many years and are numerous enough in all ports to enable any vessel in any trade to readily procure a competent pilot. When a sailing vessel enters a southern port she is handled by a licensed master, or if towed by a tug, the tug is in command of a man licensed by the federal authorities. When so towed (either by hawser or alongside) the vessel practically is under steam propulsion, and yet we are compelled to take on a pilot and pay him his fee, on the average about \$125 or \$130, and for what? It is seldom that he does more than to burden the vessel with his presence. I myself have heard the pilot—when one happened to take any interest in 'piloting' the boat—give orders to 'follow the tug.' The latter did all the piloting. In a nutshell, this practice is simply legalized blackmail. I recall one trip that cost over \$500 in pilotage fees alone. The vessel was obliged to put in at a certain port because she had sickness aboard. There was \$200; she then made another port on the same trip—\$200 more, and at another harbor we were held up to the tune of over \$100. It took half of the freight to pay the pilotage fees alone. Another instance of this outrageous discrimination: A sailing vessel had to put into one of the southern ports for repairs to her pumps. The repairs cost \$50; the pilotage tax in and out was something like \$200. Last year fully \$500,000 in all was paid in such fees at the various ports. At Norfolk alone \$90,000 was collected for state licenses. The Virginia law allows the issuance of licenses for a consideration—according to the size of the vessel, that license permitting the entrance of the vessel without one of the pilots and being good for one year. But even with this license a vessel has to take out a similar license to enter another port in the same state or else pay pilotage fee if she enters a port other than the one from which the license was issued. Georgia has a similar 'general license' law, but in South Carolina the law makes a master of a vessel liable to imprisonment if he brings his vessel into port without engaging 'the services' of a pilot.

"The whole system of pilotage charges at southern ports is a relic of past ages, adopted before the advent of steam, and is not necessary under present conditions. As a rule, sailing vessels are now towed to and from the sea. But even if they are not towed it must be remembered that the government, at enormous expense which we all have shared, has marked, buoyed lightened and deepened channels in all the harbors and published directions and charts for entering and leaving all ports, so that a navigator may find his way into and out of port without a pilot. Nevertheless, we are compelled to take on a pilot at various ports and pay them their fee. To show how unjust and unnecessary these charges are, take Norfolk, for example. The authorities will refuse to permit a vessel to enter without a pilot or license, claiming that the master of the vessel is not competent to pilot his own vessel into the harbor. And yet they will issue a license to that same vessel or master, for a consideration, without an examination of any sort. In other words, the navigator is perfectly competent—after he has paid the tribute which the law allows these robbers to exact. In foreign ports it is usually optional whether the navigator employs a pilot or not; in some ports it is compulsory only on entering the harbor. That such a state of affairs should exist in this country is certainly a disgrace and discrimination which we have suffered too long. If we could only get members of congress to listen to the facts, instead of being hoodwinked by representatives of the pilots, I have no doubt they would heed our demands for justice. That is all we ask."

Mr. F. S. Pendleton, president of the Atlantic Carriers association, said: "Owners of coastwise sailing vessels throughout the country are unanimous in the desire to be relieved from this onerous exaction. It is an outrage which has been sanctioned too long and which is rapidly annihilating the coastwise sailing business. In 1891 there were, roughly, 2,000 vessels in that trade. Ten years later the number had fallen to about 1,300, and it is less today. This pilotage tax system amounts, practically, to a subsidy to steam vessels in competition with sail in this trade. It figures as high as \$500 a week at some ports in favor of the steamer line from that harbor. It is hard enough to compete with the coastwise steamers

alone, to say nothing of this enormous tax in addition. The passage of the pending bill would end this unfair and ruinous discrimination. I have just received a bill from a Norfolk pilot for \$64. That man, as a matter of fact, did not set foot on board the vessel and knew nothing about her. That's the kind of a game we are all up against. For years we have sought relief; but the pilots are organized, have plenty of funds—to which, by the way, we contribute, and have been able to defeat any remedial legislation. The pilots of north Atlantic ports aid in defeating such measures, out of sympathy for their fellow-members in the south. The sailing vessel men have for many years been the victims of this legalized extortion, and have been all but crushed by the onerous exactions, until today they are in a poor position to put as hard a fight for legislation that will give them justice, as the pilots can to defeat it. The pilots are using our money to wage campaigns for retaining the state laws as at present. But they are like the doctor who bleeds his patient and sells his blood; before long the patient will die. There is not a single argument that the pilots or their representatives can advance which cannot be refuted, and in a way that will carry conviction to any person who will take the trouble to listen and consider the facts. There are many reasons why this discrimination should be abolished. The decadence of our ocean-going marine has left the coastwise fleet almost the only source from which to recruit our navy in time of war. In all ports where the exaction has been abrogated the pilotage system has been maintained at the highest standard of efficiency."

Mr. Alexander R. Smith, superintendent of the Maritime Exchange of New York, expressed similar views, denouncing as an outrage the discrimination now exercised against sailing vessels. The text of the bill provides that a master or mate of a sailing vessel shall be given a pilots' license by the United States inspectors, provided that upon inquiry it is proved that he possesses the requisite knowledge; that no state or municipal government shall demand a local license from him; nor shall any pilot charges be levied by any such authority.

CANADIAN SHIPPING NOTES.

J. Marlton, Goderich, Ont., is building for the Manitou Fish Co., a tug of somewhat larger dimensions than the Manitou, built in 1903.

The Algoma Navigation Co. is figuring on a project to put on two new steamers to trade between Owen Sound, Manitoulin island and north shore points.

A graving dock which the Vancouver Dry Dock & Shipping Co. proposes to construct at Vancouver, B. C., will be 500 ft. long and will accommodate vessels of 11,000 tons.

The steam vessel which the Calvin Co. is building at Garden Island, Ont., is a paddle-wheel brig, 130 ft. keel, 20 ft. beam and 9 ft. depth of hold. She is for raft towing work and for running the St. Lawrence rapids.

A plan for improvement of the terminal facilities at St. John, N. B., is under consideration by the Canadian Pacific Ry. Co., and the St. John city council. The cost of proposed new docks, warehouses, etc., will be from \$2,000,000 to \$2,500,000.

The Montreal Grain Elevating Co. has entered an action against the Montreal harbor commissioners for \$25,000 for damages sustained by the sinking of its floating elevator in the harbor, May 6, on account, it is alleged, of the defective condition of the harbor, owing to the commissioners' default.

Political quarrels have been started in Montreal relative to the proposed spending of between \$2,000,000 and \$3,000,000 on steel sheds at the wharves. This is quite in line with past history in Montreal, and will result in the lengthy postponement, if not the abandonment, of the project for completing the improvement scheme that has been in progress for the past six years.

"Les Transportations Canadiens" has been incorporated under the dominion companies' act with a capital of \$1,000,000 and with offices at Toronto to carry on a general navigation business in Canada and elsewhere. E. L. Sawyer, W. T. McMahon, F. M. Holland and others of Toronto are interested, but it is understood that Mackenzie, Mann & Co., are really behind the project.

The stern wheel steamer which the Hudson Bay Co. is building on the Peace river for its river service will be 110 ft. long, 22 ft. beam, with estimated draught, loaded, of 21 in. Her machinery will consist of one pair of long-strike direct-acting paddle-wheel marine engines, of 10 in. cylinder diameter and 48 in. stroke, and two horizontal firebox type marine boilers 48 in. by 18 ft., supplying steam at 200 lbs. pressure.

The steamer to be constructed by the Polson Iron Works, Toronto, for the fishery protection service on Lake Erie will be 176 ft. long and 22 ft. beam, with a gross tonnage of 540 tons. The hull will be of steel, fitted with twin-screw engines that are to develop a speed of 16 knots an hour, without forced draft. Accommodation will be provided for a crew of forty-five men. The steamer is to be ready for service in May, 1904. The government has placed an order at Barrow-in-Furness, England, for the construction of a steel twin-screw steamer 200 ft. long by 25 ft. beam, for the fishery protection service on the Atlantic coast. This steamer is to be fitted with a search light of 4,000 candle power and is to have an armament of Maxim-Nordenfeldt quick-firing guns. The government is negotiating for the purchase of a Newfoundland sealing steamer for the fishery protection service in Hudson bay and the northern coast. It is reported that the Neptune, which was chartered for service in Hudson bay, will be purchased, and that the two steamers will be permanently employed in the northern seas.

QUESTION OF MAXIMUM SPEED.

New York, Dec. 2.—It has again been asserted lately that the maximum speed for steamships has been attained, to which assertion I find many exceptions being taken by naval architects and engineers. Among those who are most outspoken in their views on the subject is Mr. M. Fargusson, engineer and naval architect, lately connected with the United States Ship Building Co., as naval architect and expert engineer, who has opened an office at No. 17 State street.

Mr. Fargusson, like many others engaged in engineering and ship building in this country, is of Scotch origin, but, as he is the fourth remove from the "land o' cakes" and ship builders, he is a thorough American in all the name implies, and believes that in the not-far-distant future it will be the production of the American ship builder that will set the pace for ocean steamships, as it did in former days for clipper sailing ships. He is a product of the great west and a graduate of the University of Illinois. After graduation he took an extended trip to Europe, during which he kept a sharp lookout for everything pertaining to ship building whereby an idea might be gained. Returning to his native country, with the intention of practicing his profession at some point on the great lakes, he received an offer for his services in the east, which he accepted and which resulted in him making his permanent abode on the Atlantic coast. Added to his ability as an engineer and naval architect is a thorough knowledge of practical seamanship and navigation, which enables him to properly understand the requirements of a ship in service, and thus equipped he is able to embody in his designs those qualities which go to make a thoroughly seaworthy and reliable vessel. At present he is giving special attention to increased speed for steamships and smaller power craft, and is designing boats that are to practically demonstrate his belief that the maximum speed for steamships has not yet been attained. His theory is that by means of a greater subdivision of engine power, higher steam pressures and an increase of the number of revolutions per minute, together with the use of the highest grades of material and workmanship it is possible to engine a vessel much more powerfully than is done at present—with no greater weight of machinery—and thus to build steamships, for commercial and naval purposes, which would be capable of attaining a sustained speed at sea of 30 knots, and this, if desired, on a displacement of one-half that of the present large liners.

It goes without saying that the assertion that the maximum speed for ocean steamers has been attained is an old, old story; in fact dates back to the period when the steamship lessened the time of the Yankee clipper ship across the Atlantic; but time has again and again proven those who gave utterance to the statement false prophets.

When the steamship Persia, in 1856, made the distance across the Atlantic, between New York and Queenstown, in 9 days, 1 hour and 45 minutes she broke all former records. Today, her—then wonderful—speed would be slow for a freighter. Ten years later when the Scotia made the distance in 8 days, 2 hours and 48 minutes the world stood agape; while some gifted individual, with foresight as clear as mud, exclaimed: "The maximum speed for steamships had been attained!" But alas for human prophecy; in another decade, 1876, the Germanic made the distance in 7 days, 11 hours and 37 minutes; which time was lessened by the Britannic, in 1877, 44 minutes. Then came the Arizona in 1880 with 7 days, 7 hours and 23 minutes, as a world-beating record. In 1882 the Alaska made the trip in 6 days, 18 hours and 37 minutes; followed by the Oregon two years later with a record of 6 days, 11 hours and 9 minutes, which time was lessened the same year 1 hour and 9 minutes by the America. The following year the Etruria lowered the record to 6 days, 5 hours and 31 minutes. In 1887 the Umbria made it 6 days, 4 hours and 42 minutes, and the following year a new record was made by the Etruria of 6 days, 1 hour and 55 minutes.

In 1889 the City of Paris—now the Philadelphia—made the distance in 5 days, 19 hours and 18 minutes, thus getting within the longed-for six-day limit by a fair margin. And again the maximum of speed for steamships had been attained. But in 1891 the Majestic lowered the record 1 hour and 10 minutes, and in the same year the Teutonic made the trip in 5 days, 16 hours and 31 minutes; while the following year the Philadelphia (City of Paris) lowered the time to 5 days, 14 hours and 24 minutes. Then came the Campania in 1893 with a record of 5 days, 12 hours and 7 minutes; again the Lucania in 1894 decreased the time to 5 days, 7 hours and 23 minutes, and this time has since been steadily lowered by such vessels as the Kronprinz Wilhelm and Deutschland.

Thus we see that in less than half a century the time required for a steamship to cross the Atlantic has been reduced nearly one-half, and, as there is a desire for still speedier vessels, who shall say that the speed limit for steamships has been reached? In other words, that the world shall stand still and progress in ship building shall cease? That engineering and mechanical genius shall fall into a sleep from which there is no awakening? Such a person must be rated in the "let-well-enough-alone" class, to which fortunately the progressive naval architects, engineers, ship builders and ship owners of the enlightened maritime countries of the world do not belong.

Increase of speed is the order of the day, not only as regards water but land transportation as well. When Peter Cooper ran the first railroad train in America at the unprecedented sustained speed of 15 miles an hour he possibly thought he had established the time limit for land transportation. But alas for human fore-

sight; the speed was steadily increased to 20, 30, 40, 50 miles an hour, and today the express train that can't make 60 miles an hour is considered too slow for the present age; while on several American railways short runs have been made at a speed of from 90 to 120 miles an hour.

Take the evolution of the automobile as another illustration of the increase of speed. While the first power-propelled vehicle was about the slowest and most-tired-looking thing that ever came down the pike, today their speed must be at least a mile a minute in order to be up to date, and even this speed has been beaten by some of the flyers.

The limit of speed was established by nature when she set the globe spinning on its axis with a velocity of 15 geographical miles—or knots—a minute, at the equator; and man, her most intelligent creation, is after the pace-maker with all his might and main. Hence today man is still struggling to produce something that will transport him on land and water faster and still faster, and in view of what he has accomplished in this direction since the advent of steam and electricity as motive powers it is but reasonable to presume that the maximum of speed attainable by man, on land or water, has not yet been reached by several degrees, and that the efforts of Mr. Fargusson, and others of advanced thought; to increase the speed of steamships will be crowned with success. It is surely an achievement much to be desired and the efforts to its accomplishment worthy of all possible encouragement.

In conversation with Mr. Fargusson he brought up another feature of passenger steamships that was in sore need of improvement, namely, the accommodations in way of staterooms—so-called out of courtesy—at present found on Atlantic liners. These he declared seemed to be becoming more cramped and less conveniently located than formerly, as though the modern ship owner and builder had taken their cue for economizing space, and banishing comfort, from the plans of a modern New York apartment building, in which the rooms have about reached the stage where when the folding bed is let down there is no room left for the family pet dog—they never allow children in a New York apartment, no room for them—and doggie has to be put out on the window ledge or dropped overboard into the air shaft for the night. There is small doubt but that a long suffering traveling public, forced to put up with present day steamship staterooms, will exclaim hear! hear! to Mr. Fargusson's denunciation of their lack of comfort and convenience.

As Mr. Fargusson is a thorough student, of quiet, unobtrusive mien, who goes into anything his brain and hands find to do with his whole soul, the marine world will undoubtedly await the outcome of his experiments looking to increased speed for water craft with more than ordinary interest.

GEORGE W. RAMAGE.

TO INQUIRE INTO FOREIGN-TRADE SHIPPING.

As thick as the fallen leaves of autumn are resolutions now to inquire into the state of American shipping. The latest is from Representative Sulzer of New York, who has offered a resolution in the house to appoint a joint committee to investigate the present policy of international navigation, "to trace its effects upon our merchant marine, to consider how we may constitutionally encourage it in foreign trade, and thereby regain our lost position at sea, and to report to the senate and house identical bills calculated to effect with certainty a renewed development of American shipping power."

Another one is a bill introduced by Representative Vreeland to appoint a commission to be called the "American merchant marine commission" and composed of five persons possessing expert knowledge of marine industries and legislation, to be appointed by the president with the consent of the senate. The duties of this commission are to be sweeping and are defined as follows: "To investigate questions relating to the commercial and legislative history of the marine of the United States and other nations; the cause of the rise and decadence of our marine; the influence of existent domestic laws regulating our commercial and maritime interests; the amount, character, and plan of bounties, subsidies and subventions paid by foreign nations to encourage their trade and commerce; the aids and facilities for the promotion of our foreign commerce by treaties or otherwise; the promotion of our deep-sea fisheries interests; the cost of construction and operating expenses of American ships compared with those of other nations, and such other questions cognate to the subjects to be investigated as may arise during the progress of said investigation. The commission may suggest such legislation as it may deem desirable in furtherance of our maritime interests."

The members of the commission are to be paid \$4,000 per annum each and their terms are to be for two years.

The new floating dock which is being built at the yard of the Maryland Steel Co., Sparrow's Point, Md., for the use of vessels of the United States navy at Cavite, has been insured in London for a sum approximating three-quarters of its value. The insurance covers all risk from the time construction is begun until it is finished.

Senator Perkins has offered a bill in the senate and Representative Nelson in the house to increase the number of lighthouse districts from sixteen to eighteen and to repeal the present provision prohibiting the employment of persons more than forty-five years of age in the lighthouse service.

PROPER SHIPPING LEGISLATION.

Editor Marine Review: It was an observation of Dr. Franklin that experience keeps a dear school, but fools will learn in no other. There are some fools, however, who will not learn anywhere, but grow up "wise in their own conceit." These "know it all" and never change opinion. They amuse the world somewhat, but imagine they can also instruct it "out of their own head." To instruct at all one must have learned in some school, since one knows about exterior facts only what he has learned from exterior sources. A big bump of imagination, good for any amount of fiction, cannot be drawn upon for history, or for the facts relating to any subject. It is one thing to know, but a different thing to say; and one may easily make a fool of himself by saying things that he does not know. Nowhere is this more apparent than in the controversies of the day.

Mr. John Maurice thinks Americans do too much of their own work and should import more than they do of the work of foreigners. The tariff prevents this and he hates it therefor. Desiring to hit the tariff a good rap on the fingers, he alleged that it was responsible for the too-high wages that disables Americans to compete with foreigners, as he alleges, in building and running vessels, *ergo*, the remedy for our ship disablement is extraction of "protection" in the tariff. The writer having thoroughly examined this theory—that no tariff or low tariff would operate to rehabilitate our marine—and found not a particle of proof in history or experience to sustain it, rejected it as mistaken.* This was brought to the attention of Mr. M. and he did not like it. In return he sets up that the writer desires to monopolize "the shipping question"—and he a "civil engineer and nautical expert." Forbid it all the gods! In his reply he opens a battery, not of knowledge, but conceit; draws on his imagination, not for statistics, but falsities, thinking by romance and words to win his contention. He would fain make the public believe that after more than thirty years' investigation of the subject of necessary shipping legislation by the writer, he, never having given a month to it, perhaps not a week or a day, is the better authority. This appears a piece of conceit.

Mr. M. speaks of my "intense hatred of everything foreign or British" preventing me "from seeing everything in the right light," and then gives six instances in which he pretends this is true. In each instance there is misrepresentation, misstatement, exaggeration or untruth. Occupying a foreign standpoint, Mr. M. flinches at every disclosure of the greed, the cunning, the unfairness or the imposture of our rivals. He champions their cause. It is all "right," he says, only the writer cannot see it so on account of his "hatred." He is the "expert," the writer is the novice. His observations are theodolitic, as becomes his omniscient power. Who can hold a candle for him? Nevertheless, it is demonstrable that foreigners, particularly the British, have gotten away with our carrying trade, by "all manner of means" from foul to vicious, favored by our present open policy. A full examination of the case cannot be made without discovering and laying open these facts. Such examination is well calculated to make an American hate foreigners for cause. Foreigners should be fair and honorable in their competition; they induced the adoption of this policy, which they have taken advantage of to our detriment, and which pleases Mr. M. so well that he deprecates its eradication. It will have to go, nevertheless. Doubtless his love for it balances the writer's hate. He must love it, because it has enabled the British to destroy our shipping power. He is not like the gallant Irishman, a volunteer, who defended the fort at Castine after his comrades had fled from an attack by a British "man-of-war." The landing of the boats had no terrors for him—he continued loading and firing an old carronade. The officer in command of the marines avoided its range, and getting behind the gun took Patrick prisoner. Discovering his nativity, the Briton denounced his conduct, as from one who "had no right at all to fire on His Majesty's forces," but Patrick knew better than that. "Arrah!" he exclaimed, "have I not the right to fight for the country that I get me bread in?" Here is our "civil engineer and nautical expert" getting his bread in our country but taking the part of our rivals and the spoilers of our trade and advocating policies and measures satisfactory to them.

Mr. M. states that twelve years ago I worked for the passage of a "bounty bill" and a "postal service" or "subsidy" bill. The bounty bill of 1890-91 was a compromise measure agreed upon by friends of shipping who had held several conventions and found it easier to agree upon it than upon a bill on the constitutional principle, which was then not well understood. The understanding was to try the bounty principle first. So it was tried and its passage failed. The writer was not of the bounty faction, but he endeavored faithfully to get the bill enacted. The Republicans had a majority of seventeen in the house, two Democrats voted for it, and yet it miscarried for lack of three votes. The debate and the vote of rejection showed the vice and the inexpediency of the bounty principle. Right then and there the writer ceased fighting for it as a "lost cause." It is known that he had a controversy with the editor of the Chicago Tribune in 1870, in which he showed the advantage and advocated the necessity of changing policy to the original of the founders of the government, so no one has a right to question his judgment or even consistency in this matter. Besides, the studies of twelve years ought to increase his knowledge and to ripen his judgment; and as for consistency, one would indeed be a fool, if finding himself in error he should stick to it through life. Mr. M. is a compass adjuster. Would he direct his course today by a needle that was corrected twelve years ago? If he would he is no "expert."

It was argued for the "bounty bill" that it could be quickly

passed, but after going over from one session to another it was quickly defeated. Also, that France had set an example that might be safely followed, our shipping friends forgetting that the powers of congress and of the French legislature differed in respect to government gratuities. The power of congress to establish a bounty policy in favor of any business, occupation, trade or calling was called in question in 1792. After a full debate, participated in by several of the makers of the constitution, the vote of a large majority negatived the proposition. In regard to shipping, the makers of the constitution provided a way for the "encouragement" of it. That way may be taken or left. Bounty or subsidy for the general marine may not, without violating the instrument, be substituted for it. Foreigners may prefer that we subsidize, if we do anything, but their advice will not be taken.

The writer having stated that in 1870 certain ship materials were freed of duty, Mr. M. replies that "an internal revenue tax" was then "added to the cost of vessels." This is fiction. The writer was in the business of building vessels and denies that such tax was then thus "added." Mr. M. refers to "the blockade from 1812 to 1815 and its consequences" bringing the people "near the verge of starvation." This is fiction with a grain of truth in it. There was some blockading done in front of the larger ports towards the close of the war, but if Mr. M. will consult statistics he will find to what small extent our importations were cut down. We got all that were essential for use. High freight and insurance kept out more goods than the enemy's ships. Provisions of all kinds abounded. We even fed some of our enemy's armed forces on land and sea. The "verge-of-starvation" talk is mere braggartism, as false as vain. The war of 1812 helped our factories more than any tariff ever did. They prospered. Our successes at sea and on the lakes were marvelous to the people of Europe. Out of thirteen actions we won eleven victories. Our navy became renowned. Then our country was full of woods, now it is full of people, of wealth and of means for defence. We are able to assert and maintain our rights on land or sea. The braggadocio of enemies or spies cannot disturb our serenity. We may have some among us that we cannot count on—some "nautical experts," perhaps—but there is no nation, or bully among the nations, that is able to dictate to us a shipping policy—not again. The day is at hand to regulate our commerce in favor of our own shipping, and it is going to be done, or the reason why not discussed.

WILLIAM W. BATES.

*See "American Marine," 1892. Houghton, Mifflin & Co.

MR. J. J. HILL ON SHIPPING.

Mr. J. J. Hill of the Great Northern Railway continues his opposition to any aid to shipping, not realizing that his great railway system came into being through the bounty of the federal government. Were not the enormous stretches of land, which were given to aid in the construction of his railway system, a form of subsidy? Would his railway have been built without this governmental aid? He forgets that he was the recipient of favors whose influence he would seek to despise. This is what he says of aid to shipping:

"I do not care what the bonus is, if you have not got the business you had better run your steamer to the bank and tie it up. It is business you want and not bonus. Today nobody in this country wants to own or operate ships unless he can make a connection between the ship and the United States treasury, and that kind of a merchant marine will be of no value to you or anybody else. After the civil war our merchant marine was dispersed and driven under other flags. The energy of the country and the capital of the country were devoted to exploiting the west, the new country. There is not a letter on the statute books applying to ships sailing on the high seas that is not absolutely framed against the ships. You hire sailors, firemen, anybody you can engage for a voyage, but they can quit you anywhere, leave you, and you have got to pay them to the last minute and you can help yourself in any way you can. All other nations enforce a contract. We do not. If we hire American sailors we have to pay, on the Pacific, the union price, \$30 a month, and \$36 for firemen. The other ships hire Lascars, Japanese and pay them \$5 a month in Mexican silver, and instead of \$36 they pay \$6 in silver for firemen. They are good sailors and they are good, hard working men; and they do the work. There are some American-built ships, nominally under the American flag—and it is a beautiful flag that we all reverence and love—but what has the American ship got to do? She has to land at Victoria and put off two-thirds of her crew, keep them there, and she has to pay for their keep, until she goes down to the American harbor, delivers her cargo and takes on another, and go back and land and take on her foreign sailors, and then go about her business. That is what she has got to do."

Preliminary surveys for the enlargement of the Erie canal were begun a few days ago. Surveys were undertaken in the Fort Bull, Oneida, Savannah, Tonawanda, Rochester and Medina districts. State Engineer Bond says that actual construction will not be begun until next May, so that there will be no issue of bonds until then.

An Ottawa dispatch says that an order in council has been passed appointing J. F. Frazer to be commissioner of lights of Dominion government. Mr. Frazer will have charge of the operating and maintenance of the aids to navigation and of the installation of all illuminating apparatus.

SEEN AND HEARD ON THE LOOKOUT.

Language has been defined as the garment of thought, and the English-speaking mass of humanity is said to have the best stocked wardrobe for thought-dressing purposes. The wealth of a language is gauged by the number of garments (words) it contains. The German tongue, thanks to its having, as somebody once said, "innumerable shirtwaists for each skirt" in the lingual clothespress, must be accorded the second place. Having, then, a rich language, why is "die Deutsche sprache" hardly ever used among the sailors of Germany's rapidly-increasing merchant navy. Perhaps there is some truth in the saying that the German language does not lend itself readily for use in command on ships. The officers of German ocean liners may address their passengers in the vernacular of "Unter den Linden," but among themselves, or when speaking to a member of the crew, they make use of a gibberish known as "Platt Deutsch." German statesmen know that a similarity of speech has a tendency to draw nations, as well as individuals, together. It was for this reason that, when after the war of 1870 the inhabitants of Elsaie and Lorraine sang "mais malgre ca nous restrons Francais," all the school teachers in these provinces were immediately replaced by Germans. The crews of German ships are largely recruited from those ports of the country where only the official language is heard. Though shipping under their own flag these recruits must learn a foreign tongue in order to understand their shipmates and countrymen. A sailor in Germany's merchant vessels must learn "Platt Deutsch," as a certain stigma appears to be attached to any member of a crew who expresses himself only in the official language of his country. In what language commands are given on board German men-of-war I have never had an opportunity to hear.

The sailor is, of course, possessed of some knowledge regarding that part of the Isthmian canal discussion that relates to yellow fever, cholera, etc. That the old road to civilization in the southern regions is paved with yellow fever victims, nobody can deny, and still there is a great deal of exaggeration regarding the danger of residing there now. Not very many years ago sailors emphatically refused to ship on a vessel bound for Brazil. At the time I have in mind one English steamship company (Lampert & Holt) had several of its ships anchored in the harbor of Santos. These steamers were loaded, coaled, and even fumigated, but still they were delayed, as their crews were either in the hospital or in graves. In English shipping offices the rate of pay according to the then-existing scale of wages was doubled for sailors consenting to man these idle steamers; but taking into account the rumors that were circulating regarding the size of the crewless fleet, who can blame the men for refusing to ship. A second mate of one of the Lampert & Holt steamers with whom I was well acquainted at the time but whose name I do not now recall, was sent out from England to help relieve the deadlock, which was not only an expense to his employers but also a ghastly testimonial to the ignorance of the Brazilian authorities in the matter of sanitations. This old sailor-friend is now one of Santos most influential citizens. As for the city of Santos, though it can as yet not lay claim to the distinction of being a health resort, what is known, if I remember correctly, as the British Sanitary Construction Co. prevents the recurrence of a wholesale slaughter among ships' crews while in this port. No one can deny that the region of the Isthmus of Panama is very unhealthy, but of Manila and Havana the same had always been said. The improvement that has taken place in sanitary conditions in these cities might induce even the most skeptical of pessimists not to predict a plague among the Panama canal diggers. If willing to take a few necessary precautions, no fairly-healthy individual who wishes to visit the scene of this country's prospective activities should be prevented by fear of the climate.

Monotonous, though doubtless creditable, is the continuously-heard phrase "we need more ships." Confidence in the adaptability of the youths of this country precludes worry over a scarcity of sailors to man the expected craft, but on this score I am reminded of the old English song "We have the men, we have the ships, and we have the money too." America needs only the ships. Schopenhauer in "Studies in Pessimism" said that "nothing gives more comfort in trials and misfortunes of any kind than to hear of someone even worse off than ourselves." In the language of the street this is "throwing down" the old world with a vengeance. Should the views of your readers, however, coincide with those of the German philosopher, I can give them comfort by pointing out a nation that is in even a worse plight. Turkey, with her schooners on the Black sea, the Sea of Marmora and the Bosphorus, and a few steamers trading on the Mediterranean, has all the vessels needed. But from the cruelty perpetrated by the Turkish army no one holds a very exalted opinion of her soldiers, and anyone who has ever been on a Turkish ship must ridicule the thought of that country producing sailors. Her few steamers are manned almost invariably by Austrian officers. One notable exception was a small steamer bound from Constantinople to Trieste. Leaving port at the same time as a French steamer that had cleared for Marseilles, the Turkish captain closely followed the Frenchman for several days. Hailed by the latter, who was anxious to learn the cause of the brotherly companionship, the Turk acknowledged that he was "at sea" in both meanings of the term and desirous of being directed to a place called Trieste. Discipline, cleanliness, seamanship are unknown quantities on Turkish schooners, while such a necessary

adjunct to safe navigation as a compass on most of them is deemed unnecessary luxury. But a country that on former occasions has proved beyond fear of contradiction the predilection and aptitude of its inhabitants for maritime pursuits should have ships. The advent of an American merchant navy—and one comparing favorably with that of any nation—is a good "tip" for even the most careful of gamblers.

Some time ago there came to New York city six men who had heard that beautiful passage in the declaration of independence about "life, liberty and the pursuit of happiness." Incidentally it may be remarked that they were Americans by adoption and sailors by profession. Now these six sailors, worthy representatives of unemployed labor, decided that their pursuit of happiness had been successful upon their meeting capital as represented by Capt. Joe. Smith. Capt. Joe not only sails the three-masted schooner W. L. Tuck, but, as he states it, "owns a piece of her." Shipped according to the regular wage schedule, or in other words at union wages, the six sailors boarded the Tuck, then lying at a wharf in Elizabethport, N. J. It was at this time that twelve members of the Coastwise Seamen's Union also decided to go in quest of happiness, and they pursued it in the steam launch Rex. As your readers may not enjoy a description of a brutal fight suffice it to say that the Rex returned to the city with the six sailors of schooner Tuck—all more or less severely handled. Capt. Smith, when seen in sailor town next morning, bore evidence of having been in a fight. Someone has said that "the permission to sell your labor at your own valuation is one of the elementary principles of liberty," but the crew of this schooner, as said before, had to be hired for what is termed "union wages," and then, because they did not belong to a certain organization, twelve russians hindered them in their legitimate pursuit of happiness and threaten their lives. I observed Capt. Smith's appearance after the visit of the union men to his ship. I will pass it over for the same reason that I have not given details of the fight aboard the vessel, but having seen it, would warn sailors against joining an organization that counts among its members in good standing at least twelve russians.

Although the limit of speed is said to have been reached in transatlantic liners, the companies operating the ocean ferries still tell us stories of record-breaking passages, and in this regard your readers are kept well informed, but herewith is introduced to them the German ship Wilkommen—unlucky and slow. Leaving Hamburg with a cargo of cement—14,000 barrels—the weather when in the Atlantic proved so severe that the ship had to be "hove to," though the wind was fair if the proper course could have been kept. It was now observed that the Wilkommen did not take kindly to "running," and while other vessels were going before it under fore sail and mainlower-topsail—some even under bare poles—the German cement carrier must needs be "hove to." Capt. Freeze finally managed to put into Rio Janeiro, and at that place secured new anchors, compasses and a chronometer. Though it is not unusual to hear occasionally that anchors or compasses have been swept overboard, the statement in the letter from Brazil that a similar fate befell the chronometer is rather startling. Proceeding south the Wilkommen found herself presently off Cape Horn, and now changed her former tactics by making bad weather of it when "hove to," but "running" splendidly without pooping a sea. Encountering strong north-westerly gales, the ship's change of behavior only lengthened the voyage. One hundred and ninety days after leaving Hamburg 14,000 barrels of cement reached Seattle.

While it is rather improbable that the owners of the Wilkommen derived pecuniary benefit from their vessel's performance, they expect to recoup themselves on the return freights; and, incidentally, the experience of this and other vessels while rounding Cape Horn demonstrates the urgent need of an Isthmian canal.

F. H.

TESTS OF SUBMARINE SIGNALING.

A Boston dispatch says that after witnessing successful tests of submarine signaling on the steamer James S. Whitney of the Metropolitan Line, coming around to Boston from New York, also having other proofs of the value of this invention to navigation, a party of distinguished Canadians have returned to their homes so impressed with the system that they may adopt it for the benefit of traffic on the St. Lawrence. The party included Raymond Prefontaine, Canadian minister of marine; Judge Robidoux, L. A. Wilson and Mortimer Davis, business men of Montreal; and Hugh A. Allan and Andrew D. Allan of the Allan Line. The system of submarine signaling which they inspected was that invented and developed by the late Prof. Gray. Approaching the lightships at Vineyard shoal, Pollock rip and Pollock rip shoals, all of which are equipped with submarine bells, the Canadians could distinctly hear through telephone receivers in the pilot house of the Whitney the sound of the hammer striking on the bell, and what is more to the point, it is reported that they could determine definitely the direction from whence came the sound. This is where the bell signal is of much more value than a steamer's whistle, for the whistle, while heard plainly, is sometimes deceptive in a fog, while the direction of a wave current can always be determined. A new experiment was tried while nearing Vineyard shoal lightship—that of connecting the captain's room with the pilot house receiving apparatus with a portable receiver through which M. Prefontaine heard the bell ringing as plainly as did the other gentlemen in the pilot house.

DEATH OF REAR ADMIRAL GHERARDI.

The death of Rear Admiral Bancroft Gherardi was briefly noted in the last issue of the Review but his career was worth more than passing mention. He had been in the navy for forty-eight years. His first service was on the Ohio in the Pacific squadron. In 1852 he entered the naval academy at Annapolis, which his uncle had founded when secretary of the navy under President Polk, and he was made a passed midshipman on June 8 of that year. He became a master and a lieutenant in 1855, after service in foreign waters on the steam sloop St. Louis. He was navigating officer of the Niagara when she was employed in laying the first Atlantic cable, and while on the sloop of war Saratoga aided in the capture of Walker, the Nicaragua filibuster. At the outbreak of the civil war Admiral Gherardi was on the Lancaster, with the Pacific squadron. He asked several times for more active duty, but without success. Finally in July, 1862, he came to the Atlantic coast, but was not successful in getting sea service at once. He went to an old friend, F. M. Peck, at that time a clerk in Tiffany's. One day a Massachusetts regiment passed Tiffany's and a woman customer remarked to Mr. Peck: "What a pity such gentlemanly-looking men should have to go to the front and be shot when I am sure there are enough hard characters and riffraff in our large cities to take their places." Mr. Peck replied that there were many "gentlemanly-looking men" who would only be too glad to get to the front, and he mentioned young Gherardi, who had been promoted a lieutenant on July 16, as one who would like to get the ear of Assistant Secretary G. V. Fox to induce him to send him to one of the squadrons. The woman replied that she thought she could get the ear of Mr. Fox, as she happened to be his wife, and told the other to say to the lieutenant that if he would go to Washington she would see what could be done for his interest. Gherardi did go to Washington and was ordered to the Mohican, his first engagement being the attack on Fort Macon.

Gherardi's next duty was the command of the Port Royal in the west gulf blockading squadron in 1863-'64, with which vessel he took part in the battles in Mobile bay and the capture of Mobile in 1864, with Farragut. In his official report of the order and plans for attacking Fort Morgan and the rebel fleet, Capt. Thornton A. Jenkins, who commanded the Richmond and was flag officer of a division, commended Gherardi for his "cool and courageous conduct from the moment the attack commenced to the time that his vessel was cast off from the port side of my vessel, by my order, to go in chase of the enemy's three gunboats." His last command during the war was the Pequot, in the North Atlantic squadron. He was promoted to commander on July 25, 1866, and he commanded the Jamestown and the receiving ship Independence, in turn, on the Pacific. Under his commission as captain, issued on Nov. 9, 1874, he commanded the Lancaster, as flagship of the European squadron, and was present at the bombardment of Alexandria. Ten years after his promotion to captain he received his commission as commodore, and after a year's service on the promotion examining board he was detailed as governor of the naval asylum at Philadelphia. He was made rear admiral on Aug. 26, 1887, and after nearly two years' service as commandant of the New York navy yard he succeeded to the command of the north Atlantic squadron, relieving Rear Admiral S. B. Luce upon his retirement on Feb. 7, 1889. He was present at the abdication of Legitime and the capture of Port-au-Prince by Hippolyte, and was instrumental in restoring peace and order in Hayti.

Shortly after the close of that episode came the threatened war with Chili. The admiral was then at Barbados with his flagship, the Philadelphia, and the gunboat Concord. He was instructed to assemble the vessels of his command at Montevideo and to hold them in readiness at that point. The Philadelphia and the Concord made a quick passage to Montevideo and were joined by the Chicago, the Bennington and the Atlanta. On the Pacific side, the Baltimore, the San Francisco, the Charleston and the Yorktown were held in readiness to co-operate with the Atlantic squadron. The war cloud passed and the admiral was recalled and directed to proceed overland to San Francisco and to bring to this port the ships of the Pacific squadron, which were ordered to be present at the naval review. Upon his arrival at Hampton Roads he was placed in command of all the United States ships, the squadrons of Rear Admirals Walker and Benham forming a part of the great fleet which was reviewed at Hampton Roads and afterward at this port in honor of the Columbus quadri-centennial. He took command of the navy yard in Brooklyn again in June, 1893. His retirement from active duty was in November, 1894. For a time he continued to make his home in Brooklyn, but he later removed to Stratford, Conn. He was the vice-commander for New York of the Military Order of Foreign Wars.

Attention is called to an advertisement on page 33 of this issue of two Reeves engines for sale at a bargain. As this make of engine is rated high, it will undoubtedly pay any person in need of such to get into correspondence with the Reeves Engine Co. at once, as bargains such as they offer in their advertisement are not met with every day. The advertisement shows a cut of engines.

The water hyacinth is becoming each year a greater impediment to navigation in southern rivers. Representative Broussard has introduced a bill in the house of representatives to appropriate \$50,000 to be employed in destroying it in the navigable streams of Louisiana.

ITEMS OF GENERAL INTEREST.

A bill has been introduced in congress to extend the thirteenth life-saving district to include the coast of Alaska and to establish a life-saving station at Cape Nome.

A New York correspondent says it is no wonder a ship is called "she" when she has shifts, stays, an apron, hooks and eyes, pins, caps, ribbons, hoods, poppets and a husband.

In the trial trip of the new Turkish cruiser Medjidie last week a speed of 22.4 knots was developed, being four-tenths of a knot in excess of requirements. The Medjidie was built at Cramps.

While business in the Maine ship yards has been brisk this year the tonnage is 1,200 below that of last year and far below the great year of 1901. The building for this year is 36,058 tons. The total for 1902 was 37,201 tons and the total for 1901 was 47,146 tons.

It is reported that Gov. Odell of New York has determined upon the appointment of Gen. Francis V. Greene as the head of the Erie canal engineering commission. If this be true it is a grievous fault. Greene, who is at present the police commissioner of New York, has not, latterly at least, shown any special fitness for the place. The real supporters of the canal movement are in favor of Col. Thomas W. Symons for this office. Certainly if the man is to be picked for his fitness and for his knowledge of canal construction Col. Symons will get the place.

Following is a list of vessels recently classed and rated by the American Bureau of Shipping, New York, in the "Record of American and Foreign Shipping:" American screws Goldboro and Tennessee; American schooners Massassoit, Eleanor F. Bartriers, Horace A. Stone and Iuinsburg; American terns Luzon, H. P. Shares, John R. Bergen and Mary E. Morse; American bark Edmund Phinney; American barges Annie and 101; British steamers Havana and Squid; British schooner Albert D. Mills; British terns Hiddie Poore, Myrtle Leaf and Frances; British brig Ocean Belle.

A radical change of policy regarding the time and methods of making repairs at navy yards on warships is being given serious consideration by the navy department. Many officers are said to favor the distribution of the repairs over the entire year, instead of, as at present, having all the work done at one time, thus causing serious overcrowding of the yards. Reports received at the navy department show that, with the departure of the North Atlantic squadron this week, the yards are left in bad shape. Because of the lack of work many efficient workmen will be laid off. The remedy suggested is that fewer ships be used in the winter and summer maneuvers and that while the maneuvers are in progress the reserve ships be sent to the navy yard and repaired.

Some fifty ships will assemble in the largest fleet formation in the history of the navy at Pensacola in March to hold the first record target practice of the service. Several months ago gunnery experts in the navy conceived the idea of establishing a uniform system of gunnery. The methods of drilling marksmen were made identical on all ships at all the stations and it was arranged that bronze trophies of suitable design and substantial value should be given to the three different classes of ships engaged in the fleet competition. This year there will be three of these record firings—one for the ships of the Asiatic station, possibly in Manila bay, another for the vessels of the Pacific squadron, at a place yet to be designated, and the third will be held at Pensacola. Admiral Dewey will attend the maneuvers in the Caribbean sea and observe the evolutions of the ships.

The J. B. Lippincott Co., East Washington street, Philadelphia, have just issued a book upon mechanical engineering entitled "Suplee's Mechanical Engineers Reference Book." It is a hand book of tables, formulas and methods for engineers, students and draftsmen. In preparing a hand book for engineering reference it is necessary to select from among a great mass of detailed information the matter which shall be most generally available. Naturally the differentiation which has taken place in the science of engineering makes it desirable that some one department of work shall predominate and, as indicated by the title, this book is principally devoted to the presentation of tables, formulas and reference data for mechanical engineers. It is, therefore, purposely full in the portions relating to machine design and to such information as will render it useful in the drawing room and in the designing department, the intention being to render it available broadly in furnishing a record of general principles as well as of detailed methods.

A friend of the American ship, who is not, however, favorable to subsidies, says of President Roosevelt's suggestion regarding the appointment of a commission: "I think your remarks on the chairmanship of the commission—the need of shipping men on it—were very good. I have contributed in an effort to have a member of a seaboard state appointed—one who knows at least the smell of salt water—but without result. About the president's object in suggesting the commission—delay for political purposes—you are again doubtless right, but I think in one light the president is also right, that is, if he intends to have our marine restored. The pride of opinion of Senator Frye and Senator Hanna and the others of the subsidy persuasion might for a long time prevent the passage of any but a subsidy bill. If, however, a commission should report favoring a constitutional bill this pride of opinion might give way. Probably it is best to fall in with the commission scheme, and let us see if this will prove to be the last of its sort, the first being in 1869. That one reported

for bounty. Had its report been sound, no doubt our marine would have been 'rehabilitated' years ago."

Naval constructors and engineers are discussing now, more than ever, the scout, a new type of ship that is to take its place in service strategy in the future. The war problems which have been diligently worked out in Newport at the naval war college, and in Washington by the general board, have taken into consideration this ally of the floating force and it remains to provide a ship which will meet all the tactical requirements. It looks, however, as if there would be another naval controversy over the design of these scouts, there being a difference of opinion among the naval experts as to the characteristics which these important vessels should possess. Several tentative designs have been prepared by the naval board of construction and it has been decided that the displacement of the ships shall not be less than 1,500 tons nor more than 4,000 tons, a sufficiently wide range to take in the varied views of the experts. It is a question how much endurance these ships shall have and whether there shall be much protection. An increase in the armor would mean a sacrifice in speed and coal capacity. The design will therefore be governed by the extent of the sea-going and sea-keeping qualities with due regard for the elements which maintain a maximum speed.

The naval board of which Rear Admiral G. A. Converse is president is having a hard time to carry out the instructions of the navy department and provide a scheme whereby the service shall be supplied with naval engineers. The suggestions from numerous sources are varied and so far have not aided the board to a decision. The great trouble is to find officers who could be employed in carrying out any plan. The lack of commissioned personnel is the stumbling block for the board. One radical suggestion made is that the duties are now performed under the bureau of ordnance, the bureau of steam engineering and the bureau of construction and repair shall be combined into a technical corps, of which the chief shall be a rear admiral, and under whom shall come three branches, comprising the duties of construction, engineering and ordnance. This would place under one head all the technical branches of the service, excepting that of civil engineering, which is somewhat distinct from the other work. It is further proposed that the personnel of this corps shall be of permanent assignment of officers, and that the members shall be chosen from among line officers who have reached the age of thirty years, at which time it is considered they will have passed the stage of an amateur, and will possess experience ripened by a career at sea. Such a proposition is interesting at this time only as illustrating the trend of naval view in the matter. It will not be favored by the Converse board, which will recommend an easier way out of the difficulty, and one which does not require much legislation calculated to arouse discussion or involve expense. The problem is to provide naval engineers with the least possible trouble.

TALE OF A LONE VOYAGER.

The American consul at Gibraltar forwards the following notes from log of the Columbia II., printed in the Gibraltar Official Gazette of Nov. 21, 1903:

"The Columbia II. arrived here at noon yesterday after a voyage of 100 days from Boston, Halifax and Madeira. She is a fine trim little boat but of rather frail appearance to face the heavy seas prevailing in the North Atlantic. Her dimensions are 19 ft. over all, 6 ft. beam, with a draught of 10 in., and she is fitted with a centerboard and is believed to be the smallest boat to have crossed the Atlantic. The bill of health from Madeira states crew and passengers consist of one man. Columbia II. carries a jib and mainsail similar to a number of the local pleasure boats at this port. Capt. Ludwig Eisenbraun is a German by birth but is now a naturalized American. Columbia II. left Boston on Aug. 11 with a crew of two men but on arrival at Halifax on Aug. 23 the chief mate refused to proceed any further, saying he had already gone far enough, and returned to Boston (a wiser man), leaving Capt. Eisenbraun to proceed on the voyage by himself. During his stay in Halifax Capt. Eisenbraun met Capt. Blackburn, another noted Atlantic adventurer. Owing to the mate leaving in Halifax Capt. Eisenbraun changed his plans and instead of taking a northerly passage took a southerly one. On Aug. 25 he left Halifax about noon with a fair wind and fine clear weather. On Aug. 31 he passed the Dominion Line steamer Englishman (13,000 tons) within speaking distance, but as each captain was waiting for the other to speak they passed without any communication.

"Nothing unusual to log up to Sept. 5, when during a heavy gale from the southward, while hove to with sea anchor out, the bridle carried away causing the boat to fall off in the trough of the sea and get capsized, losing the rudder, tiller and sea anchor and the watch used for the navigation of the boat. All of his provisions also were spoiled, and as the captain enters in his log, he lost everything but hope. On Sept. 9 at 2 p. m. he spoke to a British steamer bound to Galveston, the captain of which steamer very kindly gave the lonely voyager a cheap watch which took the place of the lost one for navigating purposes. On Sept. 17 he spoke the British steamship Greembrier, bound to Jamaica, receiving a fresh supply of water and provisions. Nothing unusual to log up to Oct. 10, when, while the captain was enjoying a short nap, his little vessel collided with a sleeping whale but luckily escaped with only a drenching. Oct. 16 he sighted the land which was supposed to be Madeira, arriving at said place on Oct. 20 in good health after a passage of fifty-six days. During the stay of twelve days in Madeira the Columbia II. was cleaned and painted. On Nov. 1 he left Madeira for Gibraltar, and after a fine passage arrived off Europa Point on Nov. 20 when the captain of the port very kindly sent a boarding officer with the port launch to convey to the lonely voyager his compliments and to ask if he would like to be towed into the harbor, which offer was readily accepted.

BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (SEPTEMBER, 1903)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	-	-	-	-	-	-	-	355,560 H. P.
English Royal Navy	-	-	-	-	-	-	-	929,300 "
Russian Imperial Navy	-	-	-	-	-	-	-	227,500 "
Japanese Imperial Navy	-	-	-	-	-	-	-	122,700 "
Austrian Imperial Navy	-	-	-	-	-	-	-	56,700 "
Italian Royal Navy	-	-	-	-	-	-	-	13,500 "
Chilian Navy	-	-	-	-	-	-	-	26,500 "
Argentine Navy	-	-	-	-	-	-	-	13,000 "
The "Messageries Maritimes" Company	-	-	-	-	-	-	-	87,600 "
Chemins de fer de l'Ouest: (The French Western Railway Co.)	Steamships plying between Dieppe and Newhaven	-	-	-	-	-	-	18,500 "
Total Horse Power of Boilers in Use	-	-	-	-	-	-	-	1,850,860

Société Anonyme des Etablissements Delaunay Belleville

CAPITAL: 6,000,000 FRANCS

Works and Dock Yards of the Ermitage at Saint-Denis (Seine), France.

Telegraphic Address: Belleville, Saint-Denis Sur-Seine

TRADE NOTES.

The Durable Wire Rope Co., Boston, has leased for a term of years, the remodeled stores Nos. 26-30 Atlantic avenue at the head of Lewis wharf and is already located in the new quarters.

The Loomis Pettibone Gas Machine Co. of 52-54 William street, New York, has recently opened branch offices in the State Mutual building, Boston, Farmers' Bank building, Pittsburg, and First National Bank building, Chicago.

Mr. R. L. Newman, naval architect and engineer, has removed his office to the Morris building, 66 and 68 Broad street, New York. Mr. Newman is well known both on the coast and about the great lakes. He is now engaged on work description of which will be published later.

M. R. Manhard of Marquette, Mich., who is engaged in whole sale and retail hardware, sends to the Review an attractive calendar showing two schooners stranded at Marquette. It is a very good photograph indeed. Mr. Manhard does a general business in mining, mill and lumber supplies.

The Scully Steel & Iron Co. of Chicago have issued a beautiful catalogue of steel and iron workers' tools. The tools made by the company are carefully illustrated and described. The illustrations have been thoroughly wrought out so that the work is clear in every detail. No finer machinery catalogue has ever come into this office.

When it can be effectively done there is probably no composition more attractive than that which is contrived with the living model. The trouble is to get it effectively done. The Ashton Valve Co., 271 Franklin street, Boston, has been unusually fortunate in selecting a living picture subject for its calendar. It shows a little boy and girl fishing with a St. Bernard dog as an interested spectator. The poses are natural and the beauty of the calendar is enhanced by the fact that it is issued in colors. Incidentally, of course, Ashton high grade "pop" valves and guages are advertised.

David Kahnweiler's Sons, 437 Pearl street, New York, makers of metallic life boats, rafts and cork jackets, have issued an attractive calendar, the pictorial feature of which is a wash drawing entitled "The Young Skipper." It is in one tone and is well printed. It represents a boy, costumed as a sailor, looking through a pair of marine glasses, evidently at a yacht race, as a model of the Reliance is a part of the composition. Illustrations on the back of the calendar show the goods manufactured by Kahnweiler's Sons. The calendar will be sent to anyone upon request. The firm is also issuing a tide calendar for New York and vicinity.

As closely associated in name and trade as is Carnegie with steel, Armour with beef, Baldwin with the locomotive, and Corliss with the steam engine, so is the name Sturtevant associated with the blower. Still the introduction to the second edition of their condensed general catalogue, which recently went to press,

would seem to indicate that a well-known name sometimes has its disadvantages. The reputation of Sturtevant blowers, made for over forty years, is world-wide, but the company finds it difficult to impress upon the public the corresponding magnitude of its business in the engine and electrical fields, begun with the manufacture of the means of driving fans ten years after the first blower works was established. To the engines and motors, therefore, a great deal of space is accorded in the catalogue referred to.

Mr. Thomas C. Frenyear, sales manager of the new Canadian Westinghouse Co., died of typhoid fever at Fort William, Dec. 10. He was a man of exemplary life, unusual business judgment and ability, and was remarkable for the clearness and force of his ideas. His is the first death in nearly five years among the higher officials of the Westinghouse Electric Co. Mr. Frenyear was thirty-eight years of age. He was employed by the Boston Electric Co. when only fifteen years old. Previous to entering Westinghouse employ in 1895 he was connected with the Thomson-Houston and Brush Electric companies as a salesman, with his headquarters in Buffalo. In announcing the death to the officials of the Westinghouse company, Vice-President Taylor said: "The management desires to place on record its thorough appreciation of his able and loyal service and of the loss to the Westinghouse interests by the untimely removal of a young and zealous official whose future seemed so full of promise."

The iron ore shipments of the port of Superior as given in the last issue of the Review and as shown by the dock superintendent will show a discrepancy of 4,890 tons. The shipments as given in the Review last week were 3,978,579 tons; as given by the dock superintendent they are 3,983,469 tons. The discrepancy is brought about in this manner: On Dec. 15 a cargo of 4,890 tons was loaded upon a steamer, too late to be brought down, however, as the canals were already closed. It is classed by the dock superintendent as a shipment because it has really been shipped; but no cognizance has been taken of it by the shipping company because it has not been delivered. It properly belongs, of course, in this year's total and will be so included in the table of shipments by mines which will be compiled early in January.

Maj. W. H. Bixby, government engineer at Detroit, has asked for a leave of absence for one year, owing to ill health. This has been granted to him and he will be succeeded by Lieut. Col. C. E. L. B. Davis, who has just been relieved from duty as division engineer in the Philippines. Maj. Bixby succeeded Col. Lydecker at Detroit and has made an enviable reputation for himself. This will be Maj. Bixby's first leave of absence for seventeen years.

The Dominion government has passed an order in council granting a 3 per cent. bonus up to \$30,000 a year for twenty years towards the construction of a floating self-docking steel pontoon dock at Vancouver, B. C. The plans show a dock 500 ft long, 85 ft. wide, inside measurement, and to have a lifting capacity of 11,000 tons. The work is to be completed in eighteen months.

Steamships, Government, Revenue and Lighthouse Vessels, Yachts and Boats of all descriptions

Supplied with

FURNISHINGS

"From Steerage to Captain's Cabin."

Covering everything that can possibly be required in

**Furniture,
Beds,
Carpets and Rugs,
Upholsteries,
Bedding,
Groceries,**

**Galley Ranges,
Galley Utensils,
Monogram and
Crested Linens,
China and
Glassware, etc.**

Detailed work requiring special plans or sketches carried out by expert operators.

We gladly submit Estimates free of charge.

PROMPT DELIVERY OF GOODS.

Address

CONTRACT DEPARTMENT.

SIEGEL COOPER CO.,

6th Ave., 18th and 19th Sts.,

NEW YORK CITY.

Please mention Marine Review, when writing.

Good Tow at a Bargain.

Ten thousand dollars will buy a lake steamer and tow barge that carry 2,700 tons of ore. Steamer has steeple compound engines and Scotch boiler. Address Box 55, Marine Review Pub Co., Wade Building, Cleveland

Feb 3

Several Tow Barges Wanted.

Wanted—To purchase several tow barges or schooners with 30 ft. beam or over. Address L. E. S., Muskegon, Mich.

Jan. 7

Wanted.

Wanted—New or second hand hydraulic steering gear for tug boat. Address Patrick Keohane, Fayetteville, N. Y.

Dec. 31

"Seaboard Steel Castings"

A Guarantee of Quality.

Open Hearth Steel Castings of the Highest Grade for Locomotive, General Machinery and Shipbuilding Work.

Subject to U. S. Government, Lloyds, Railroad and Other Highest Requirements.

**Seaboard Steel Casting Co.,
Chester, Pa.**

CANADIAN WESTINGHOUSE COMPANY.

From the Pittsburg offices of the Westinghouse Electric & Mfg. Co. comes announcement of the organization of the Canadian Westinghouse Co., Ltd., a corporation formed under the laws of Canada with a capital of \$2,500,000, with works at Hamilton, and principal sales office at Toronto. All Canadian business in Westinghouse electric apparatus will hereafter be handled by the Canadian company. All existing contracts will, however, be completed by and settlements therefor will be made with the Westinghouse Electric & Mfg. Co. at Pittsburg. The works at Hamilton will be completed at an early date, and apparatus for use in Canada will be manufactured there.

Under the terms of the agreement between the Canadian Westinghouse Co., Ltd., and the Westinghouse Electric & Mfg. Co., the former has the benefit of all the accumulated experience of the latter, and of all improvements it may introduce, as well as of the services of its engineering staff, thus insuring to users of the product of the Hamilton works the same high-class apparatus as that made in Pittsburg. In other words, the apparatus made in Canada will be designed by the same engineers and

manufactured under the same system as that made in the United States. The Canadian works have been established to meet the growth of business in Canada.

One of the representatives of H. A. J. Helvig, 228 Pearl street, New York, manufacturer of ship lanterns and lamps, says they have many new and attractive additions to make to their already large stock, which they will have ready for the spring trade. "Mr. Helvig has been engaged in the lamp and lantern business," he says, "for the last twenty years, gradually building from a very humble beginning, until we are now one of the largest (if not the largest) manufacturers of ship's lamps and lanterns in the country. Our products are sold in every port of the United States—Atlantic, Pacific and great lakes—and also in Mexico and Canada, and throughout the Scandinavian countries of Europe. All the home business, as well as a large export trade, is attended to by Mr. Helvig personally. No one is better known in the lamp and lantern business than Mr. Helvig, as he travels almost the entire year, superintending the handling and selling of our goods."

Wanted.

Marine engineer to sell water tube boilers. Must be experienced in selling machinery. Address Box 54, Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland, O.

Dec. 24.

Small Steam Barge for Sale.

I have for sale a small steam barge. Carries 250 tons. Address, Capt. F. E. Wood, Alexandria Bay, N. Y.

tf

Engine Wanted.

Wanted fore-and-aft compound engine of 14 and 28 in., or a little smaller would do. Address Capt. F. Dana, Alexandria Bay, N. Y.

Dec. 31

Hull Draughtsman Wanted.

Hull draughtsman experienced in battleship work wanted by the Fore River Ship & Engine Co., Quincy, Mass. Apply at once.

Dec. 24

Tug for Sale.

For Sale—Tug J. W. Bennett, with or without booms. Address Bayfield Towing Co., Bayfield, Wis.

tf

For Sale—A Bargain.

One Brown Hoisting Machinery Company all iron and steel post jib crane, 15-ton capacity, 35 ft. 3 in. radius of hook, 18 ft. 6 in. lift. The hoisting mechanism is driven by dust-proof motor. The crane is in excellent condition and has been a very satisfactory machine. A. Garrison Foundry Co., Pittsburgh, Pa.

Dec. 10

Yacht for Sale.

New beautiful 100-ft. steam yacht, fully equipped. Owner physically unable to use yacht. Will sell for any reasonable offer. Yacht can be seen in Detroit. Address M. J. STEFFENS, 57 East Twenty-second st., Chicago.

tf

For Sale.

Tug Duncan City. Address, Geo. Pankrantz Lumber Co., Sturgeon Bay, Wis.

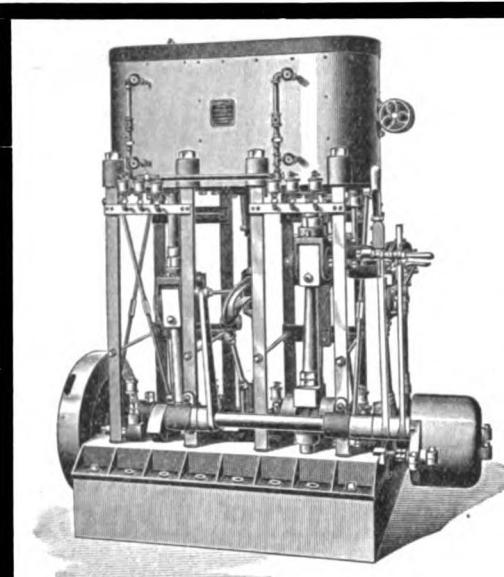
tf

Engine for Sale.

For Sale—Fore and aft compound engine, 27 and 50x40 in. Has been entirely overhauled and is as good as new. High pressure cylinder can be reduced if desired. Engine is now at shops of Montague Iron Works, Montague, Mich. For further particulars address the Montague Iron Works.

tf

WHITE OAK
TIMBERS, PLANK
AND
DIMENSION STOCK
F. S. SHURICK,
18 Broadway, NEW YORK CITY



We offer Two
7½" & 17" x 10"

REEVES
Fore-and-aft
COMPOUNDS
as shown in cut.

A Great Bargain.

These fore-and-aft COMPOUNDS have been used in a pleasure yacht just long enough to limber them up, and having recently been thoroughly overhauled, are ready for immediate service.

They are fitted with Steel and Brass disc Thrust Bearings and Reeves Patented Reversing Motion.

Some One's Going to Get Them CHEAP and QUICK.

ADDRESS

The Reeves Engine Company,
85 Liberty Street, New York.

Dec. 24.

Proposals for the Improvement of the Port of Iloilo, P.I.—Sealed proposals in triplicate will be received until noon, February 1, 1904, and thereafter publicly opened for the following work to be done at Iloilo, P.I., or as much thereof as may be completed for the sum of \$150,000 U.S. currency. The construction of 6,100 lineal feet of dike or fascine bank protection composed of piles, mattresses and stone. The dredging of 410,000 cubic yards of material in the river channel and the depositing of the material back of the dikes. Envelopes containing proposals should be plainly marked "Proposals for the Improvement of the Port of Iloilo, P.I." Plans, specifications and contracts can be obtained and examined at this office or at the U. S. Engineer's offices at New York, Chicago, San Francisco and Portland, Oregon; also at the Bureau of Insular Affairs, Washington, D. C. Bidders are invited to be present at 4 p.m., February 1, 1904, when bids for the work as a whole will be opened. Address all communications to the Consulting Engineer to the Commission, Santa Potenciana Building, Manila, P.I. J. W. BEARDSLEY, Consulting Engineer to the Commission.

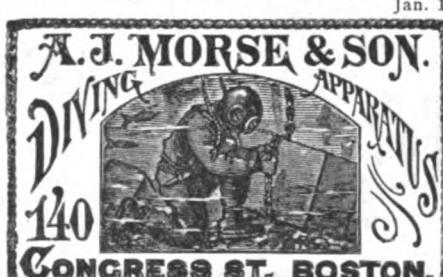
Dec. 24

Proposals for the Improvement of the Port of Cebu, P.I.—Sealed proposals in triplicate will be received until noon, February 1, 1904 and thereafter publicly opened for the following work to be done at Cebu, P.I. The construction of a bulkhead and dock about 2,600 feet long, the dredging of the channel adjacent to said bulkhead, and the filling in of the area immediately back of the same, or so much thereof as may be completed for the sum of \$350,000 U.S. currency. Envelope containing proposal should be plainly marked "Proposal for the Improvement of the Port of Cebu." Plans and specifications can be obtained and examined at this office or at the U. S. Engineer's offices at New York, Chicago, San Francisco and Portland, Oregon; also at the Bureau of Insular Affairs, Washington, D. C. Bidders are invited to be present at 4 p.m., February 1, 1904, when bids for the work as a whole will be opened. Address all communications to the Consulting Engineer to the Commission, Santa Potenciana Building, Manila, P.I. J. W. BEARDSLEY, Consulting Engineer to the Commission.

Dec. 24

U. S. ENGINEER OFFICE, Vicksburg, Miss., Dec. 22, 1903. Sealed proposals for building Locks and Dams Nos. 4 and 6, Ouachita River, Ark. and La., will be received here until 11 a.m., Jan. 22, 1904, and then publicly opened. Information furnished on application. CHAS. S. BROMWELL, Capt., Engrs.

Jan. 14



PITTSBURGH WHITE METAL CO.

MANUFACTURERS OF THE BEST

BABBITT and ANTI-FRICTION

Metals

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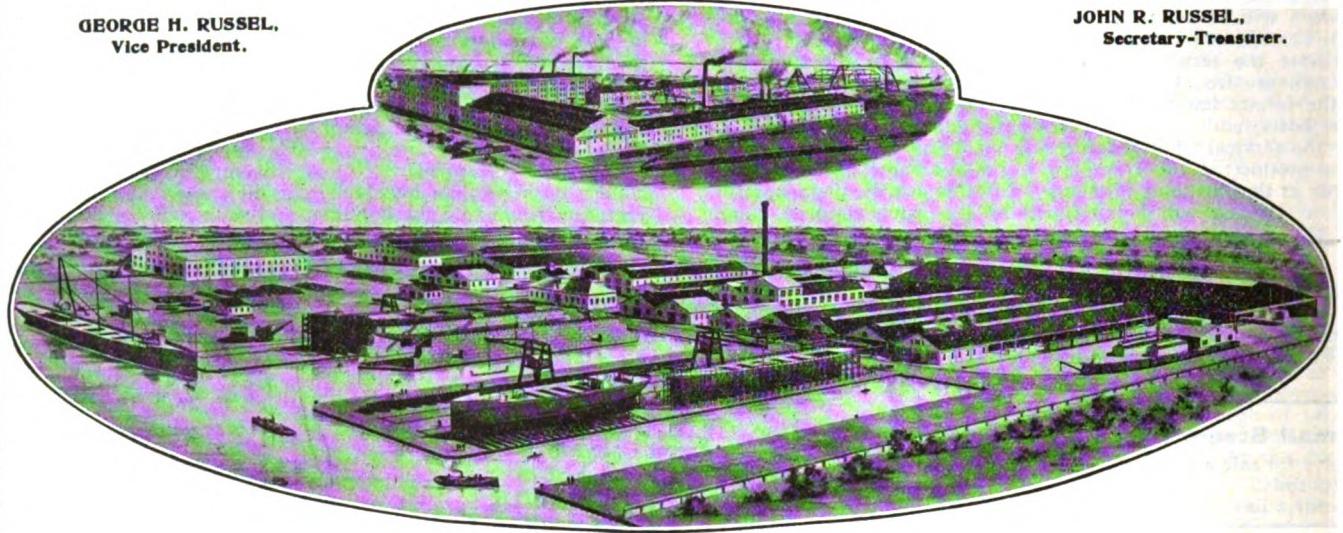
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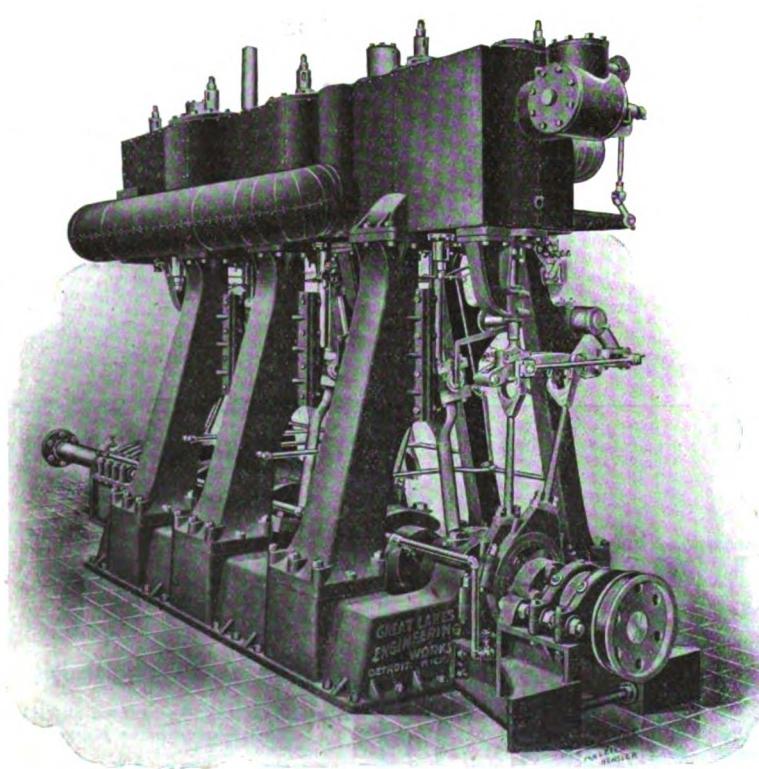
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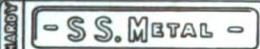
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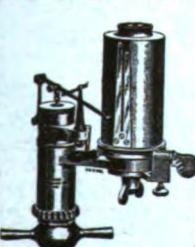
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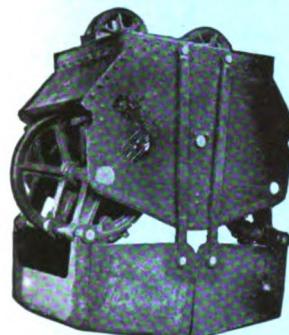
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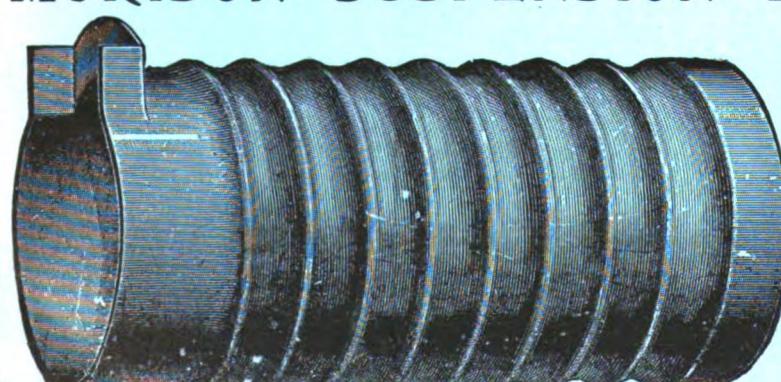
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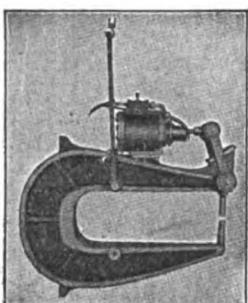
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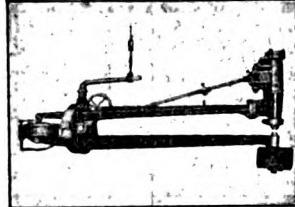
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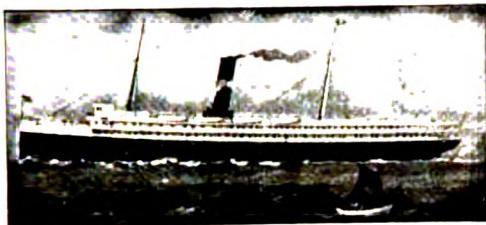
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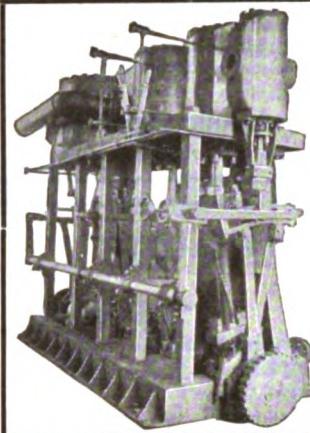
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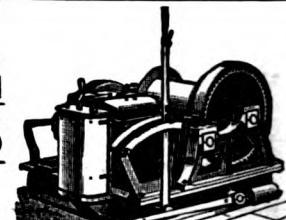
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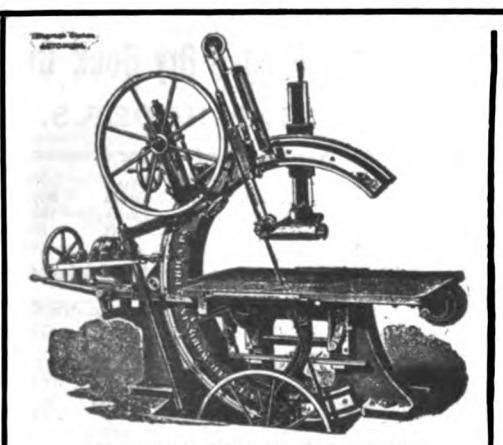
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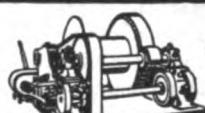
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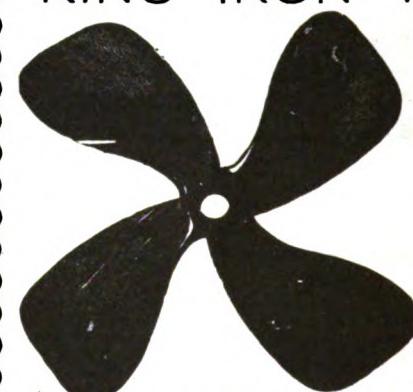
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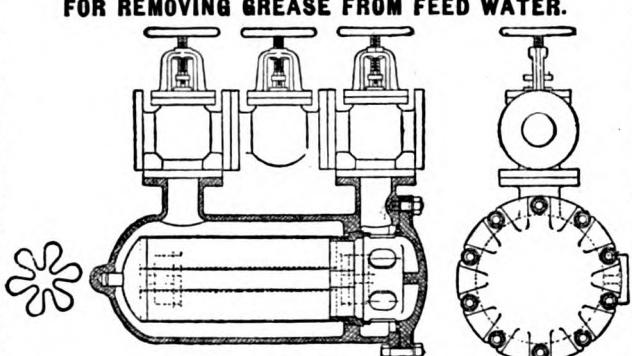
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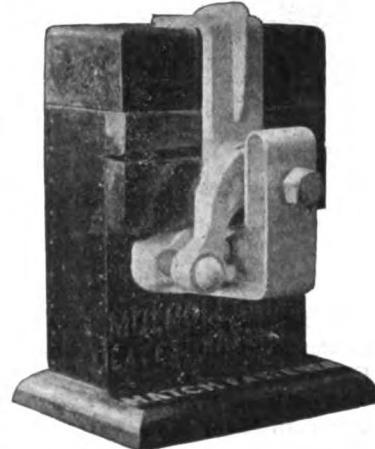
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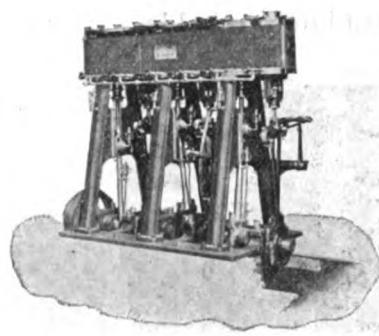


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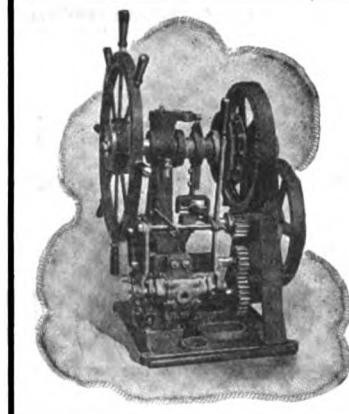
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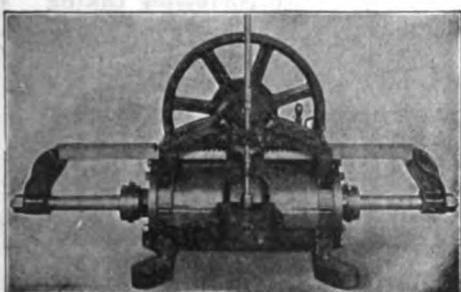
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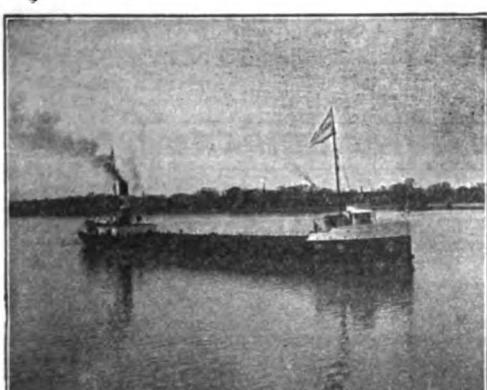
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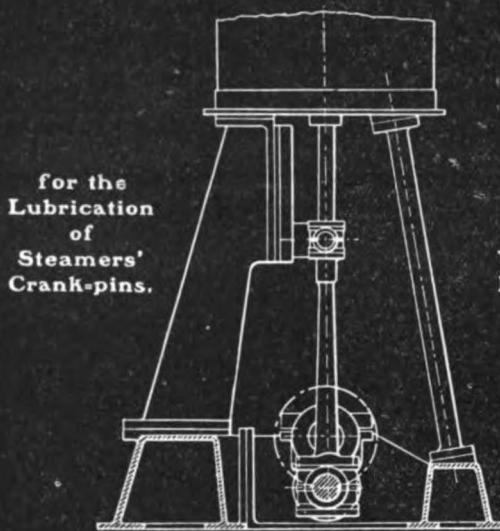
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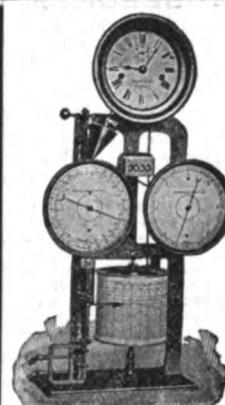
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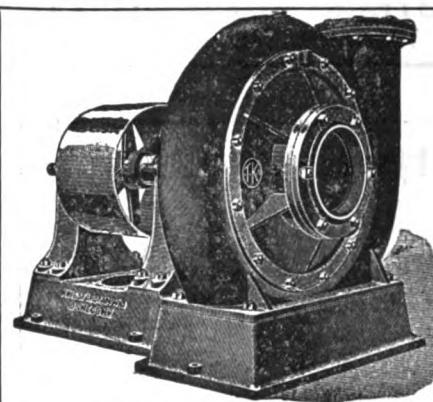
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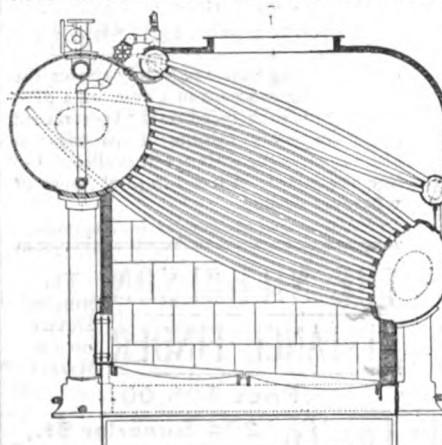
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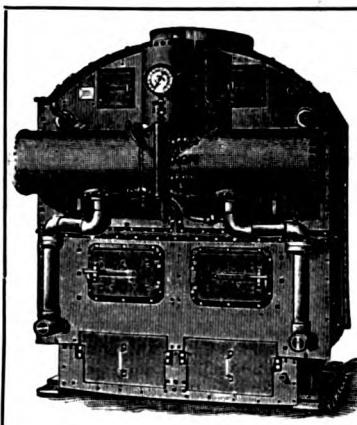
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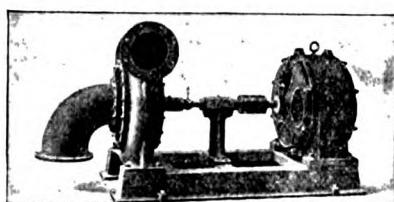
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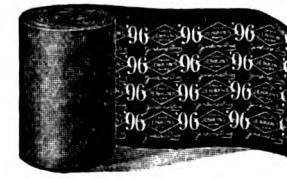
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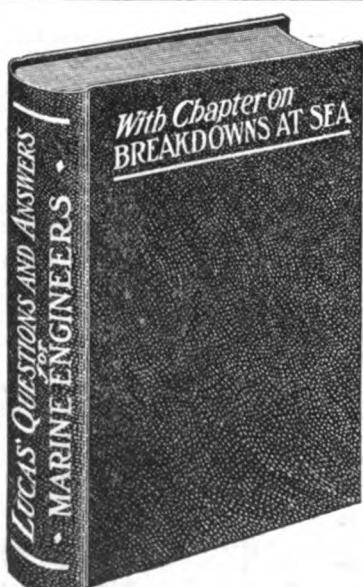
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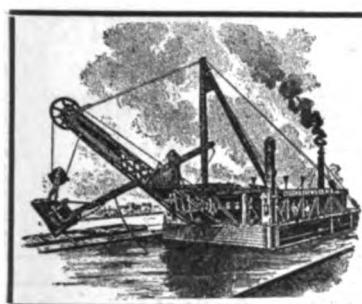
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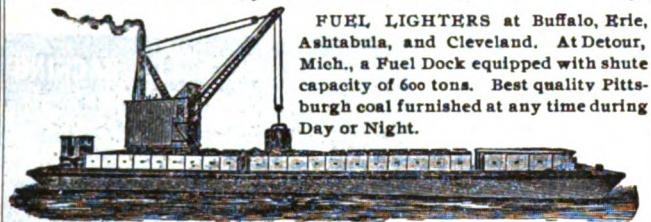
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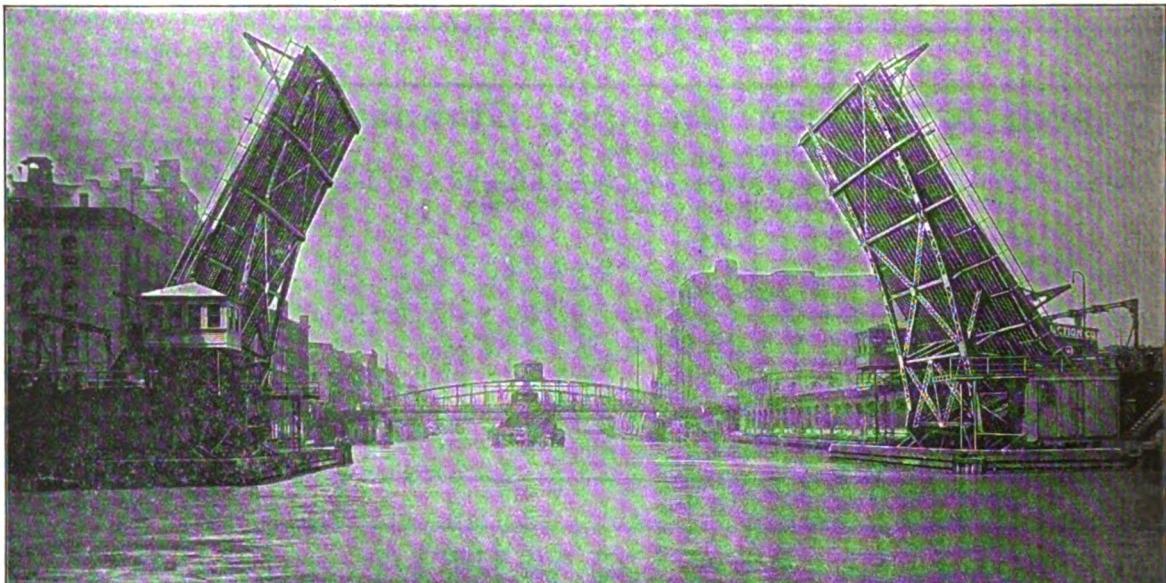
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DREDGING CONTRACTORS.

Buffalo Dredging Co. Buffalo.

Chicago & Gt. Lakes Dredge & Dock Co. Chicago.

Dunbar & Sullivan Dredging Co. Buffalo.

Fitz-Simons & Connell Co. Chicago.

Lake Erie Dredging Co. Buffalo.

Smith Co., L. P. & J. A. Cleveland.

Starke Dredge & Dock Co., C. H. Milwaukee.

DRY DOCKS.

American Ship Building Co. Cleveland.

Atlantic Works. East Boston, Mass.

Buffalo Dry Dock Co. Buffalo.

Chicago Ship Building Co. Chicago.

Craig Ship Building Co. Toledo, O.

Cramp, Wm. & Sons. Philadelphia.

Detroit Ship Building Co. Detroit.

Great Lakes Engineering Works. Detroit.

Lockwood Mfg. Co. East Boston, Mass.

Manitowoc Dry Dock Co. Manitowoc, Wis.

Marine Construction & Dry Dock Co. New York.

Maryland Steel Co. Sparrow's Point, Md.

Milwaukee Dry Dock Co. Milwaukee.

Newport News Ship Building Co. Newport News, Va.

Shipowners Dry Dock Co. Chicago.

Superior Ship Building Co. Superior, Wis.

United States Ship Building Co. New York.

ELECTRIC LIGHT AND POWER PLANTS.

Elwell-Parker Electric Co. Cleveland.

General Electric Co. Schenectady, N. Y.

Sturtevant, B. F. Co. Boston.

Westinghouse Electric & Mfg. Co. Pittsburgh, Pa.

ENGINE BUILDERS, MARINE.

American Ship Building Co. Cleveland.

Atlantic Works. East Boston, Mass.

Chicago Ship Building Co. Chicago.

Chase Machine Co. Cleveland.

Craig Ship Building Co. Toledo, O.

Cramp, Wm. & Sons. Philadelphia.

Dake Engine Co. Grand Haven, Mich.

Detroit Ship Building Co. Detroit.

Fletcher, W. & A. Co. Hoboken, N. J.

Fore River Ship & Engine Co. Quincy, Mass.

Great Lakes Engineering Works. Detroit, Mich.

Hall Bros. Philadelphia.

Jenski Ship Building Co. Port Huron, Mich.

Lockwood Mfg. Co. East Boston, Mass.

Macbeth Iron Co. Cleveland.

Maryland Steel Co. Sparrow's Point, Md.

Milwaukee Dry Dock Co. Milwaukee.

Moulton Steering Engine Co. New York.

Newport News Ship Building Co. Newport News, Va.

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

ENGINE BUILDERS, MARINE.—Continued.

Northwestern Steam Boiler & Mfg Co., Duluth, Minn.
Kirkon Iron Works.....San Francisco
Roach's Ship Yard.....Chester, Pa.
Sheriffs Mfg. Co.....Milwaukee
Superior Ship Building Co.....Superior, Wis.
Thropp, J. E. & Sons Co.....Trenton, N. J.
Trout, H. G.Buffalo
United States Ship Building Co.....New York
Warrington Iron Works.....Chicago
Willard, Chas. P. & Co.....Chicago

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York
MacLean Hydraulic Signal Co.....Chicago

ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co.Chicago
Kieley & Mueller.....New York
Lunkenheimer Co.....Cincinnati
McCUTCHEON, C. H.Buffalo
Moers & Co., H.Milwaukee
New York Belting & Packing Co.....New York
Northwestern Steam Boiler & Mfg. Co., Duluth, Minn.
Reilly Repair & Supply Co., James.....New York
Ripley Hardware CoGrafton, Ill.

ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Hynd, Alexander.....Cleveland
Hunt, Robt. W. & Co.....Chicago
Kidd, Joseph.....Duluth, Minn.
Matteson & Drake.....Philadelphia
Mottat & Son.....San Francisco
Mosher, Chas. D.....New York
Nacev, James.....Cleveland
Newman, R. L.New York
Pittsburg Testing Laboratory, Ltd.....Pittsburg
Powell, Ambrose V.Chicago
Roelker, H. B.New York
Seidler, Perkins & FieldNew York
Steel, Adam.....Cleveland
Wood, W. J.Chicago

EVAPORATING AND DISTILLING APPARATUS.

Reilly Repair & Supply Co., James.....New York

FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co.....Boston

FEED WATER PURIFIERS AND HEATERS.

Learmonth, Robert.....Buffalo
Reilly Repair & Supply Co., James.....New York
Ross Valve Co.....Troy, N. Y.

FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

FORGES.

Sturtevant, B. F. Co.....Boston

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.....Cleveland
Fore River Ship & Engine Co.....Quincy, Mass.
Macbeth Iron Co.....Cleveland

FLUE WELDING.

Fix's, S. SonsCleveland

FURNACES FOR BOILERS.

Continental Iron Works.....New York

FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland
Ironville Dock & Coal Co.....Toledo, O.
Pickands, Mather & Co.....Cleveland
Pittsburg Coal Co.....Cleveland
Rochester & Pittsburg Coal & Iron Co....Buffalo
Smith, Stanley B. & Co.....Detroit
Smith Coal & Dock Co., Stanley B.Toledo, O.
Youghiogheny & Lehigh Valley Coal Co....Chicago

GALLEY UTENSILS.

Siegel Cooper Co New York

GASKETS, RUBBER.

New York Belting & Packing Co.....New York

GAS BUOYS.

Safety Car Heating & Lighting Co.....New York

GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland

GAUGES, STEAM AND VACUUM.

American Steam Gauge Co.....Boston
Ashton Valve Co.....Boston
Lunkenheimer Co.....Cincinnati

GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

GROCERIES AND SUPPLIES.

Siegel Cooper Co.....New York

HATCH FASTENERS.

Mulholland, Capt. M.Cleveland

HAMMERS, STEAM.

Chase Machine Co.....Cleveland

HEATING APPARATUS.

Sturtevant, B. F. Co.....Boston

HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland
Brown Hoisting Machinery Co., Inc.Cleveland
Chase Machine Co.....Cleveland
Elwell-Parker Electric Co.....Cleveland
General Electric Co.New York
Hyde Windlass Co.....Bath, Me.
Lisgerwood Mfg. Co.....New York
Marine Iron Co.....Bay City
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

HOSE, RUBBER.

New York Belting & Packing Co.....New York

HYDRAULIC DREDGES.

Great Lakes Engineering Works Detroit

HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York

ICE MACHINERY.

Roelker, H. B.New York

INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co.....Boston
Ashton Valve Co.Boston

INJECTORS.

American Injector Co.....Detroit
Crane Co.Chicago
Jenkins Bros.New York
Lunkenheimer Co.Cincinnati
Peuberth Injector Co.Detroit, Mich.

INSURANCE, MARINE.

Brown & Co.Buffalo
Elphie, C. W. & Co.....Chicago
Fleming & Co., P. H.Chicago
Hawgood & Co., W. A.Cleveland
Hilm & Co., D. T.Duluth
Hutchinson & Co.Cleveland
McCarthy, T. R.Montreal
McCurdy, Geo. L.Chicago
Mitchell & Co.Cleveland
Mottat & SonSan Francisco
Pack, Chas. E. & W. F.New York and Chicago
Prindiville & Co.Chicago
Richardson, W. C.Cleveland
Sullivan, D. & Co.Chicago
Weeks, F. H.New York

IRON ORE AND PIG IRON.

Bourne-Fuller Co.Cleveland
Hanna, M. A. & Co.....Cleveland
Pickands, Mather & Co.Cleveland

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Marine Construction & D. D. Co.Mariner's Harbor, S. I., N. Y.
Truscott Boat Mfg. Co.St. Joseph, Mich.
Warrington Iron Works.....Chicago
Willard, Chas. P.Chicago

LIFE FLOATS.

Carley Life Float Co.New York

LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong Cork Co.Pittsburg
Carley Life Float Co.New York
Drin, Thos. & SonWilmington, Del.
Kahnweiler's Sons, D.New York
Lane & DeGrootLong Island City, N. Y.
Marine Construction & Dry Dock Co.Mariner's Harbor, S. I., N. Y.
Ripley Hardware Co.Grafton, Ill.

LIGHTS, SIDE AND SIGNAL.

Helwig, H. A. J.New York
Russell & WatsonBuffalo

LOGS.

Bliss, John & Co.New York
Nicholson Ship Log Co.Cleveland
Walker & Sons, ThomasBirmingham, Eng.
Also Ship Chandlers.

LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

LUBRICATORS.

Crane Co.Chicago
Lunkenheimer Co.Cincinnati

LUMBER.

Martin-Barris Co.Cleveland
Moran Bros. Co.Seattle, Wash.
Shurick, F. S.New York

MACHINISTS.

Chase Machine Co.Cleveland
Lockwood Mfg. Co.East Boston, Mass.
Macbeth Iron Co.Cleveland
Moers & Co., H.Milwaukee
Union Machine & Boiler Co.Cleveland

MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.Philadelphia

MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I.East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.New York
Siegel Cooper Co.New York

MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland
Bloomsburg & Co., H.Baltimore, Md.
Detroit Ship Building Co.Detroit
Sturtevant, B. F. Co.Boston

METALLIC PACKING.

Hayden Mfg. Co., N. L.Columbus, O.
Katzenstein, L. & Co.New York
U. S. Metallic Packing Co.Philadelphia

METAL POLISH.

Bertram's Oil Polish Co.Boston

MOTORS, GENERATORS—ELECTRIC.

Elwell-Parker Electric Co.....Cleveland
General Electric Co.Schenectady, N. Y.
Sturtevant, B. F. Co.Boston
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

NAUTICAL INSTRUMENTS.

Bliss, John & Co.New York
Kitchie, E. S. & SonsBrookline, Mass.

NAUTICAL SCHOOLS.

Chicago Nautical School.Chicago
Gould's Navigat'n School.Cleveland
McNevin's Navigation School.Detroit
McNevin's Navigation School.San Francisco
Seattle Nautical School.Seattle, Wash.

NAVAL ARCHITECTS.

Hynd, AlexanderCleveland
Kidd, JosephDuluth, Minn.
Matteson & DrakePhiladelphia
Mosher, Chas. D.New York
Nacev, JamesCleveland
Newman, R. L.New York
Skidler, Perkins & FieldNew York
Steel, AdamCleveland
Wood, W. J.Chicago

OAKUM.

DeGrauw, Aymar & Co.New York
Stratford Oakum Co.Jersey City, N. J.

OIL FOR PAINTING.

Sipe & Co., James B.Allegheny, Pa.

OILS AND LUBRICANTS.

Dixon Crucible Co., JosephJersey City, N. J.
Standard Oil Co.Cleveland
United States Graphite Co.Saginaw, Mich.

PACKING.

Crane Co.Chicago
Hayden Mfg. Co., N. L.Columbus, O.
Jenkins Bros.New York
Katzenstein, L. & Co.New York
New York Belting & Packing Co.New York
United States Metallic Packing Co.Philadelphia

PAINTS.

Baker, Howard H. & Co.Buffalo
Detroit White Lead Works.Detroit
New Jersey Zinc Co.New York
Sipe & Co., James B.Allegheny, Pa.
United States Graphite Co.Saginaw, Mich.
Upson-Walton Co.Cleveland

PATENT ATTORNEYS.

Thurston & BatesCleveland

PATTERN SHOP MACHINERY.

Atlantic Works, Inc.Philadelphia

PILE DRIVING AND SUBMARINE WORK.

Buffalo Dredging Co.Buffalo
Chicago & St. Lakes Dredge & Dock Co.Chicago
Dunbar & Sullivan Dredging Co.Buffalo
Fitz-Simou & Connel Co.Chicago
Lake Erie Dredging Co.Buffalo
Smith Co., L. P. & J. A.Cleveland
Starke Edge & Dock Co., C. H.Milwaukee

PIPE-JOINT COMPOUND.

United States Graphite Co.Saginaw, Mich.

PIPE, WROUGHT IRON.

Bourne-Fuller Co.Cleveland
Crane Co.Chicago
Macbeth Iron Co.Cleveland

PLANING MILL MACHINERY.

Atlantic Works, Inc.Philadelphia

PLATES—SHIP, STRUCTURAL, ETC.

Bourne-Fuller Co.Cleveland

PLUMBING, MARINE.

Reilly Repair & Supply Co., James.....New York
Sands, Alfred B. & Son.....New York

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

PNEUMATIC TOOLS.

Allen, John F. New York.

POLISH FOR METALS.

Bertram's Oil Polish Co. Boston.

PRESSURE REGULATORS.

Kieley & Mueller New York.
Ross Valve Co. Troy, N. Y.

PROPELLER WHEELS.

American Ship Building Co. Cleveland.
Atlantic Works. East Boston, Mass.
Cramp, Wm. & Sons. Philadelphia.
Detroit Ship Building Co. Detroit.
Fore River Ship & Engine Co. Quincy, Mass.
Great Lakes Engineering Works. Detroit.
Junks Ship Building Co. Port Huron, Mich.
Lockwood Mfg. Co. East Boston, Mass.
Manitowoc Dry Dock Co. Manitowoc, Wis.
Marine Construction & Dry Dock Co.
..... Mariner's Harbor, S. I., N. Y.
Maryland Steel Co. Sparrow's Point, Md.
Milwaukee Dry Dock Co. Milwaukee.
Newport News Ship Building Co. Newport News, Va.
Ridron Iron Works. San Francisco.
Roush's Ship Yard. Chester, Pa.
Shipowners Dry Dock Co. Chicago.
Smith & Son, Abram. Algonac, Mich.
United States Ship Building Co. New York.
Warrington Iron Works. Chicago.
Willard, Chas. P. & Co. Chicago.

PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co. Cleveland.
General Electric Co. Schenectady, N. Y.
Westinghouse Electric & Mfg. Co. Pittsburgh, Pa.

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F., Mfg. Co. New York.
Great Lakes Engineering Works. Detroit.
Kingford Foundry & Machine Wks. Oswego, N. Y.
"Long-Arm" System Co. Cleveland.

PUNCHES, RIVETERS, SHEARS.

Allen, John F. New York.

RANGES.

Russell & Watson Buffalo.
Siegel Cooper Co. New York.

REFRIGERATING APPARATUS.

Roelker, H. B. New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register. Cleveland.

Record of American & Foreign Shipping. New York.

RIVETING MACHINES.

Allen, John F. New York.

RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co. Cleveland.

SAFETY VALVES.

American Steam Gauge Co. Boston.
Ashton Valve Co. Boston.
Crane Co. Chicago.
Hayden Mfg. Co., N. L. Columbus, O.
Lunkenheimer Co. Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co. Buffalo.
Upon-Walton Co. Cleveland.
Wilson & Silsby Boston.

SALVAGE COMPANIES.

See Wrecking Companies.

Chicago Naval School. Chicago.
Gold's Navigation School. Cleveland.
McNevin's Navigation School. Detroit.
McNevin's Navigation School. San Francisco.
Seattle Nautical School. Seattle, Wash.

SEARCH LIGHTS.

Elwell-Parker Electric Co. Cleveland.
General Electric Co. Schenectady, N. Y.
Westinghouse Electric & Mfg. Co. Pittsburgh, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co. Cleveland.

SHIP BUILDERS.

American Ship Building Co. Cleveland.
Atlantic Works. East Boston, Mass.
Buffalo Dry Dock Co. Buffalo.
Cramp, Wm. & Sons. Philadelphia.

TOOLS, WOOD WORKING.

Atlantic Works, Inc. Philadelphia.

TOWING MACHINES.

American Ship Windlass Co. Providence, R. I.
Chase Machine Co. Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co. Kingston, Ont.
Midland Towing & Wrecking Co., Ltd. Midland, Ont.

TRAPS, STEAM.

Kieley & Mueller New York.
Lunkenheimer Co. Cincinnati.
Sturtevant Co., B F. Jamaica Plain, Boston.

TRUCKS.

Boston & Lockport Block Co. Boston.

TUBING, SEAMLESS.

Shelby Steel Tube Co. Pittsburgh, Pa.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. Boston.
Ashton Valve Co. Boston.
Crane Co. Chicago.
Hayden Mfg. Co., N. L. Columbus, O.
Jenkins Bros. New York.
Kieley & Mueller New York.
Lunkenheimer Co. Cincinnati.
Moers & Co., H. Milwaukee.
Ross Valve Co. Troy, N. Y.

VALVES FOR WATER AND GAS.

Ross Valve Co. Troy, N. Y.

VARNISHES.

Detroit Varnish Co. Detroit.
Detroit White Lead Works. Detroit.
New Jersey Zinc Co. New York.
Also Ship Chandlers.

VESSEL AND FREIGHT AGENTS.

Holand, John J. Buffalo.
Brown & Co. Buffalo.
Elwell, Jas. W. & Co. New York.
Elphicke, C. W. & Co. Chicago.
Fleming & Co., P. H. Chicago.
Hall & Root. Buffalo.
Helm & Co., D. T. Detroit.
Hawgood & Co., W. A. Cleveland.
Holmes, Samuel. New York.
Hutchinson & Co. Cleveland.
King, Rufus S. New York.
McCarthy, T. R. Montreal.
Moffat & Son. San Francisco.
Norman, R. L. New York.
Weeks, F. H. New York.

STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co. New York.
Holmes, Samuel. New York.
King, Rufus S. New York.
McCarthy, T. R. Montreal.
Moffat & Son. San Francisco.
Norman, R. L. New York.
Weeks, F. H. New York.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line. New York.
International Mercantile Marine Co. Philadelphia.
Pere Marquette R. R. & S. S. Line. Milwaukee.
Red Star Line. New York.

STEEL CASTINGS.

Seaboard Steel Casting Co. Chester, Pa.
Macbeth Iron Co. Cleveland.

STEERING APPARATUS.

American Ship Building Co. Cleveland.
Chase Machine Co. Cleveland.
Dake Engine Co. Grand Haven, Mich.
Detroit Ship Building Co. Detroit.
Hyde Windlass Co. Bath, Me.
Junks Ship Building Co. Port Huron, Mich.
Moulton Steering Engine Co. New York.
Sheriffs Mfg. Co. Milwaukee.

STOCKS, BONDS, SECURITIES.

Fahey & Co. Cleveland.

SUBMARINE DIVING APPARATUS.

Morse & Son, A. J. Boston.
Schrader's Son, A. New York.

SURVEYORS, MARINE.

Gaskin, Edward. Buffalo.
Hvnd, Alexander. Cleveland.
Matteson & Drake. Philadelphia.
Nacev, James. Cleveland.
Newman, R. L. New York.
Steel, Adam. Cleveland.
Wood, W. J. Chicago.

TESTS OF MATERIALS.

Hunt, Robert W. & Co. Chicago.
Pittsburg Testing Laboratory Ltd. Pittsburg.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co. New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F. New York.
Watson-Stillman Co. New York.

WINDLASSES.

American Ship Windlass Co. Providence, R. I.
American Ship Building Co. Cleveland.
Hyde Windlass Co. Bath, Me.
Junks Ship Building Co. Port Huron, Mich.

WINCHES.

American Ship Windlass Co. Providence, R. I.
Hyde Windlass Co. Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc. Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co. Kingston, Ont.
Midland Towing & Wrecking Co., Ltd. Midland, Ont.

YACHT AND BOAT BUILDERS.

Drein, Thos. & Son. Wilmington, Del.
Lane & DeGroot. Long Island City, N. Y.
Marine Construction & Dry Dock Co. New York.
Rippley Hardware Co. Grafton, Ill.
Truscott Boat Mfg. Co. St. Joseph, Mich.
Warrington Iron Works. Chicago.
Willard, Chas. P. & Co. Chicago.

YAWLS.

Drein, Thos. & Son. Wilmington, Del.
Lane & DeGroot. Long Island City, N. Y.

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Crane Co.	7-13	Hyde Windlass Co.	48	Prindiville & Co.	40	Upson-Walton Co.	48
Oake Engine Co.	13	International Mercantile Marine Co.	3	Record of American & Foreign Shipping	8	U. S. Metallic Packing Co.	48
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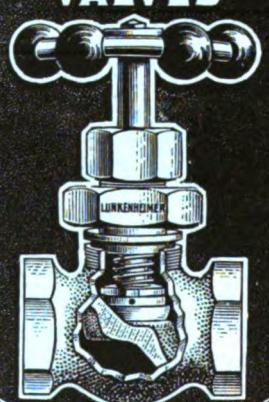
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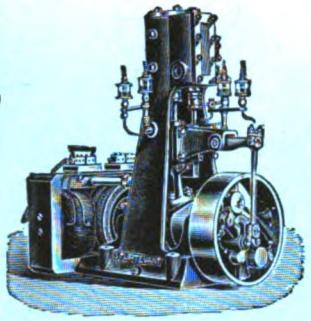
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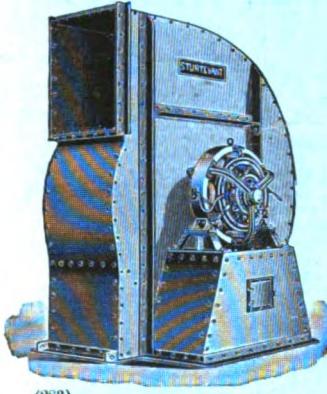
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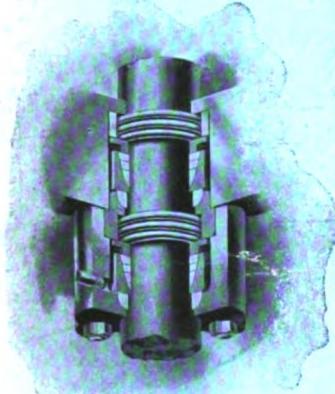
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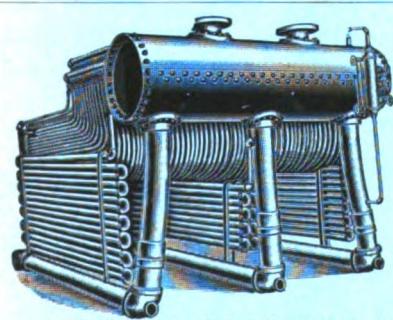
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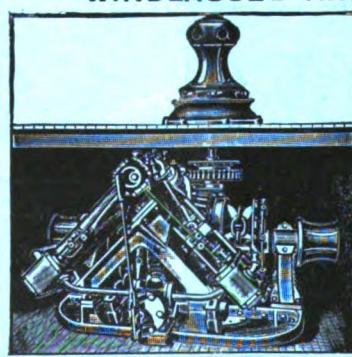
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